DIDACTICAL PERSPECTIVES OF AURAL TRAINING

by

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DECLARATION

I the undersigned hereby declare that the work contained in this dissertation is my own original work and has not previously in its entirety or in part been submitted at any university for a degree.

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ABSTRACT

The purpose of this research endeavour is to develop an understanding of the general state of Aural Training as presented in Aural Training literature and at a tertiary level. Based on this understanding, recommendations for a theory towards Aural Training are furthermore made.

The investigation consists of three main parts. In the first two parts, an in-depth theoretical study, exploring aspects such as the *rationale behind Aural Training*, *teaching ideologies*, *contents and target group* and *methodological approaches* found in published an unpublished sources, as well as a practical questionnaire-based survey, investigating selected Aural Training aspects as presented on a tertiary level in the *Republic of South Africa (RSA)*, the *Federal Republic of Germany (FRG)*, and the *United States of America (USA)* are presented. A model of an integrated Aural Training approach for children is proposed in the third part.

Results from both the theoretical and practical surveys indicate that: (a) the rationale behind Aural Training has not been thoroughly thought through; (b) Aural Training lecturers with sound pedagogical credentials are needed; (c) prospective students are not prepared for their tertiary Aural Training courses; (d) the Aural Training curricula at most tertiary music institutions do not meet lecturers' expectations; (e) more instruction time is needed for classes scheduled in both individual and group tuition; (f) Aural Training literature and teaching methods are still influenced by the Behaviouristic school of psychological thinking, with its emphasis on drill and practice; (g) methods such as Sight Singing and Dictation are more frequently applied than others, possibly because they are readily quantifiable; (h) most emphasis is placed on tonal music; (i) research results in which holistic approaches to Aural Training have been recommended since the early 1980s are not reflected in the majority of Aural Training work-/textbooks and teaching methods; (j) commercially available software is often chosen because of its availability and not because of being based on sound pedagogical principles; (k) there is a growing interest amongst lecturers to re-examine the goals of Aural Training and to apply music psychological principles.

Because of the already mentioned problem of improperly prepared prospective music students and the scarcity of Aural Training approaches to develop children's musical consciousnesses, a model for integrating Aural Training into the instrumental/vocal music lesson through composition is proposed. This model is based entirely on (a) the conviction that most effective learning takes place through active involvement and creation, and (b) music psychological principles such as *Gestalt* perception, the developmental theories of Piaget, Gardner and Swanwick-Tillman, and the musical thinking process theories of Prince and Webster. Through the application of this model, Aural Training can be approached by dealing with wholes within a musical context. Structural and perceptual thinking, as well as the mental principles of exploring, applying, problem-solving and critical reasoning can also be developed. It offers a comprehensive approach to learning written theory skills, and the opportunity to apply all other Aural Training methods. Examples of children's compositions are presented to support this model.

It is finally recommended that: (a) Aural Training lecturers should constantly re-examine their objectives, contents, teaching philosophies and methods applied; (b) advanced courses in Aural Training should be offered at all tertiary music institutions in order to meet the need for adequately trained lecturers; (c) a compulsory course on the didactics

of Aural Training should be offered for all music students; (d) more instruction time should be made available for Aural Training; (e) Aural Training should be treated in its own right in grading policies; (f) holistic approaches to both classroom-based and programmed Aural Training should replace drill and practice; (g) music from all style periods should be included; (h) a wide spectrum of Aural Training methods should be incorporated and not mainly Sight Singing and Dictation; (i) lecturers should inform themselves about recent research results and try to incorporate these into their Aural Training curricula and syllabi; (j) Work-/textbooks and computer software based on holistic and comprehensive approaches to Aural Training should be released; (k) Aural Training should be incorporated from the very first instrumental/vocal lesson by applying an integrated, holistic approach through composition.

SAMEVATTING

Die doel van hierdie navorsing is om 'n ondersoek te loods na die algemene stand van gehooropleiding soos daargestel in musiekliteratuur, en soos aangebied aan tersiêre musiekinstansies: 'n Model vir geïntegreerde gehooropleiding word ten slotte voorgestel aan hand van hierdie inligting.

Die inhoud van die ondersoek is in drie hoofdele georganiseer. In die eerste deel word 'n teoretiese ondersoek geloods na die *redes vir, en doelstellings van gehooropleiding*, *onderrigfilosofieë*, *inhoud en teikengroep*, en *metodiese benaderingswyses*. Die mate waarin hierdie aspekte, soos gevind in gepubliseerde en ongepubliseerde bronne, neerslag gevind het in tersiêre gehooropleidingsprogramme in die *Republiek van Suid-Afrika*, die *Federale Republiek van Duitsland* en die *Verenigde State van Amerika*, vorm die kern van die vraelys-gebaseerde tweede deel. 'n Model vir geïntegreerde gehooropleiding met kinders word in die derde deel voorgestel.

Resultate van beide die teoretiese en praktiese ondersoeke toon dat: (a) die redes vir, en doelstellings van gehooropleiding nog nie goed deurdink is nie; (b) spesiaal geskoolde gehooropleidingsdosente benodig word; (c) voornemende musiekstudente nie voorbereid vir tersiêre gehooropleidingskursusse is nie; (d) die gehooropleidingskurrikula nie aan die vereistes van die meeste gehooropleidingsdosente voldoen nie; (e) meer onderrigtyd benodig word vir gehooropleiding, wat in beide individuele en groepsonderrig plaas behoort te vind; (f) gehooropleidingsmetodes steeds sterk beïnvloed word deur die Behavioristiese skool van musiekpsigologiese denke waarin dril en herhaling beklemtoon word; (g) bladsang en diktee voorkeur geniet bo ander metodes, waarskynlik as gevolg van die feit dat studente se antwoorde makliker gekwantifiseer kan word as in ander metodes; (h) tonale musiek meestal beklemtoon word; (i) navorsingresultate waarin holistiese benaderingswyses tot gehooropleiding sedert die begin van die 1980's aanbeveel word, min tot geen invloed op die meerderheid gehooropleidingsteksboeke en -metodes gehad het; (j) kommersieel beskikbare rekenaarprogramme dikwels gekies word op grond van beskikbaarheid en nie op grond van pedagogiese doelstellings nie; (k) daar 'n toenemende geïnteresseerdheid onder dosente is om die doelstelling van gehooropleiding te re-evalueer, en om musiekpsigologiese beginsels in gehooropleiding te inkorporeer.

Vanweë die reeds genoemde probleem van onvoorbereide voornemende musiekstudente wat gehooropleiding betref en die skaarsheid aan gehooropleidingsprogramme vir kinders, is 'n model vir die integrering van gehooropleiding deur middel van komposisie in die instrumentale en/of sangles voorgestel. Hierdie model is gebaseer op (a) die oortuiging dat die mees effektiewe vorm van leer plaasvind d.m.v. aktiewe betrokkenheid en skepping; en (b) die musiekpsigologiese beginsels van *Gestalt*-waarneming, die ontwikkelingsteorieë van Piaget, Gardner en Swanwick-Tillman, en musikale denkprosesteorieë van Prince en Webster. Deur middel van hierdie model kan gehooropleiding benader word vanuit 'n holistiese oogpunt deurdat gehele binne 'n musikale konteks behandel word. Daardeur word nie net strukturele en persepsuele denke ontwikkel nie, maar ook verstandelike denkprosesse soos ontdekking, aanwending, probleemoplossing en kritiese denke. Dit bied ook die geleentheid vir 'n geheelbenadering tot die aanleer van musiekteoretiese kennis en skryfvaardighede, en die inkorporering van alle ander gehooropleidingsmetodes. Voorbeelde van kinders se komposisies is ingesluit as bewys daarvoor dat dit wel in die praktyk toepasbaar is.

Ten slotte word aanbeveel dat: (a) gehooropleidingsdosente hulle doelstellings, onderrigfilosofieë en -metodes voortdurend krities moet betrag en ondersoek; (b) gevorderde kursusse in gehooropleiding aan alle tersiêre musiekinstansies aangebied behoort te word om sodoende te voorsien in die nood van onvoldoende geskoolde dosente; (c) alle studente verplig moet word om 'n kursus in gehooropleidingsdidaktiek te volg; (d) meer onderrrigtyd ingeruim behoort te word vir gehooropleiding; (e) gehooropleiding as 'n vak in eie reg behandel moet word by puntetoekennings; (f) metodes van dril en herhaling met holistiese benaderingswyses tot gehooropleiding in beide klaskamergebaseerde en geprogrammeerde onderrig vervang moet word; (g) musiek van alle stylperiodes ingesluit behoort te word; (h) 'n wye spektrum van gehooropleidingsmetodes aangewend moet word en nie slegs bladsang en diktee nie; (i) gehooropleidingsdosente hulself voortdurend op hoogte van die nuutste navorsingsresul-tate behoort te hou en moet poog om hierdie resultate in hulle gehooropleidingsprogramme te integreer; (j) gehooropleidingsboeke en rekenaarprogramme wat op holistiese en kontekstuele benaderings tot gehooropleiding gebaseer is, gepubliseer moet word; (k) gehooropleiding vanaf die eerste instrumentale en/of sangles geïntegreer behoort te word deurdat die voorgestelde model van 'n holistiese benaderingswyse d.m.v. komposisie aangewend word.

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My interest in music and its aural qualities began as a five-year-old child playing melodies 'by ear' on the piano. Through the years many teachers and friends were responsible for the fostering of this lively interest which finally lead to the completion of this investigation into Aural Training. As no research can be completed without the help of other people and institutions, I would like to make use of this opportunity to thank everybody who at one stage or another formed part of the creation process.

Dr Paul Loeb van Zuilenburg guided this endeavour in his kind, fatherly and professional way, not an easy task as we were literally continents apart from each other. I am also very thankful for the help offered and recommendations made by Prof. Reino Ottermann, Dr Nicol Viljoen and Mr Johan Blankenberg, who all formed part of the committee of examiners.

Since the largest part of my research was completed in the Federal Republic of Germany, I am also indebted to Prof. Hubert Haas, Prof. Rainer Wehinger and Prof. Irene Matz from the *Staatliche Hochschule für Musik und Darstellende Kunst* in Stuttgart who acted as my supervisors in Germany. I wish to express my deepest thanks to all 14 lectures of the department of Aural Training at this *Musikhochschule* for allowing me to observe their Aural Training approaches and methods, and for not getting tired of answering a constant stream of questions. I would also like to thank the following persons and institutions which hosted me on a study tour: Prof. Markus Ulbrich at the *Staatliche Hochschule für Musik Freiburg im Breisgau*, Prof. Christoph Hohlfeld and the Aural Training departments of the *Hochschule für Musik und Darstellende Kunst Hamburg*, *Hochschule für Musik Köln* and *Hochschule der Künste Berlin*.

A questionnaire formed part of this survey and was sent to Aural Training lecturers at tertiary institutions in the Republic of South Africa, the Federal Republic of Germany and the United States of America. I would like to thank the 134 lecturers in these countries who diligently took part in the research project. Mr. Christoph Matz was responsible for the illustrations in the questionnaire.

Regarding the supply of study material, I am greatful to the editors of the *Journal of Music Theory Pedagogy* who donated all the back issues of this journal, and Prof. Fred Hofstetter and Prof. Gary Wittlich who provided me with free copies of their Aural Training software. I was also assisted in statistical issues by Dr Marianne Haßler and Mr. Karl Kirschmann, and in language issues by Dr Edwin Hees who did a very thorough job in proofreading and editing the final copy.

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Last but not least I must mention the moral support of dear friends and close family members. The moral support and indispensable help of my husband Theo cannot be expressed in words. All I can say is, thank you ...

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CHAPTER ONE

Purpose, methodology and literature review

> "Daß 'Hören' ein ganz zentraler Bereich des Musikunterrichts ist, wem müßte man das sagen! Hören als Verhaltensweise, Hören als Lernbereich, Hören als 'ear training', Hören als auditiver Eingangskanal, Hören als physiologischer, medizinischer, psychologischer, pädagogischer Forschungsgegenstand - und einfach Hören als alltägliche Wahrnehmungsform..."[1]

INTRODUCTION

Aural Training is starting to outgrow its childhood state where it was looked upon by the majority of students, music teachers and lecturers as an unimportant, time-consuming subject. It is conspicuous that whole issues of the *Journal of Music Theory Pedagogy* (Spring 1988) and *Musik und Unterricht* (March 1991) were devoted to hearing and Aural Training.

The *D-A-CH* conference, "Musikalische Grundausbildung an Ausbildungsstätten für Musikberufe" (Regensburg, Germany, 1976), was the first conference that could be traced to have Aural Training and the role of listening in other music disciplines as central themes.[2] *RAMP: Musical Awareness: A Conference on Aural Training* (Huddersfield United Kingdom, 1987) and another *D-A-CH* conference (Regensburg 1987) addressed the same topics.[3] Both the *Second Institute for Music Theory Pedagogy Studies* (Boulder, Colorado 1989) and the *Third Institute for Music Theory Pedagogy Studies* (Missoula, Montana 1992) conferences concentrated on didactical aspects of Aural Training.[4]

Aspects of Aural Training were also discussed along with other topics at, for example, the *Fourth Canadian Symposium on Instructional Technology: Computer Technologies for Productive Learning* (Winnipeg 1983) where Blais and

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1 Wilfried Gruhn, "Editorial" in **Musik und Unterricht**, 2/7 (March 1991) p. 3.
"No one needs to be told that 'hearing' forms an important central area of Music Education! 'Hearing' as a way of behaviour, 'hearing' as learning domain, 'hearing' as 'ear training', 'hearing' as an auditory access channel, 'hearing' as the subject of physiological, medical, psychological and pedagogical research - and simply 'hearing' as a part of everyday life..." (Researcher's translation).

2 Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

3 Michael Henson, "A Conference on Aural Training" in **British Journal of Music Education,** 4/3 (November 1987) pp. 301-302.
Janet Ritterman, "Review of *RAMP: Musical Awareness: A Conference on Aural Training* [Michael Henson, (Ed.) Huddersfield Polytechnic 1987]" in **British Journal of Music Education,** 5/2 (1988) pp. 195-197.
Wolf Peschl, "D-A-CH-Tagung 1987 in Regensburg" in **Musikerziehung**, 41 (October 1987/88) pp. 12-30.

4 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 243-253.
Michael R. Rogers, "A Report on the 1992 CMS Theory Pedagogy Institute" in **Journal of Music Theory Pedagogy**, 6/2 (1992) pp. 35-41.

Prével introduced "The Melocapteur: A Pitch Extractor Peripheral Design for Ear Training"[5]. At the *6. Stuttgarter Sommerkurse 1990*, seminars such as "Hören neuer Musik" and "Jazz-Ear-Training" were offered.[6] Workshops on various German Aural Training computer programs, as well as a research report on the influence of computer-assisted instruction on aural achievement, formed part of the *KlangArt KonGress 1991* (Osnabrück, Germany).[7] The *Festival des Hörens* (Erlangen, Germany, 1990) concentrated on physiological, acoustical and music philosophical aspects of hearing, but Aural Training as such was not addressed.[8]

Along with the abovementioned periodicals and conferences, the increasing inquisitiveness into Aural Training is also reflected in the number of lectures presented at some *Musikhochschulen*, such as the Stuttgart *Musikhochschule*, as observed over a period of five years. Apart from individual and group Aural Training, extra non-mandatory lectures on aural analysis, techniques of hearing counterpoint, etc. were included in the curriculum. The number of these extra lectures increased from three in the 1988 syllabus to ten in the 1992 syllabus.[9] A growing interest in auditive awareness was also visible in the developments in the undergraduate curriculum at Indiana University between 1950 and 1989.[10] In South African tertiary music, Aural Training has gained status as a subject in its own right at most universities since the 1970s.[11]

This concern with Aural Training was preceded by an awakening of interest in *Aural Education* ("Hörerziehung")[12] in German public schools in the late 1960s and early 1970s.[13] With the application of terms like *Auditive Perception Education* ("auditive Wahrnehmungserziehung"), a further distinction was made between simply hearing music and reacting to music by means of improvisation, sound experiments, composition and other realizations of what was

5 F. Blais and M. Prével, "The Melocapteur: A Pitch Extractor Peripheral Design for Ear Training in Music", lecture read at the **Fourth Canadian Symposium on Instructional Technology: Computer Technologies for Productive Learning**. Winnipeg, Manhattan: National Research Council of Canada, 1983, pp. 515-518.

6 Conference attended by the researcher. No official report available.

7 University of Osnabrück, **KlangArt KonGress**. Congress prospectus, 1991, pp. 93 and 99.

8 City of Erlangen, Siemens, Bavarian Broadcast Company and the Friedrich-Alexander-University Erlangen-Nürnberg, **Festival des Hörens: Programmübersicht 20-30.9.1990**. Erlangen: Palais Sutterheim, Marktplatz 1, 1990.

9 *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart*, **Vorlesungsverzeichnis Wintersemester 1988/89**, p. 12, and **Vorlesungsverzeichnis Sommersemester 1992**, pp. 18-19.

10 Mary H. Wennerstrom, "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 153-176.

11 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987, pp. 240-257.

12 *Aural education* refers to broad school music education based on an auditive approach, with listening as the central point of focus. The main difference between *Aural Training* and *Aural Education* lies in the broader anthropological approach of the latter vs the more detailed approach of musical elements in the former.

13 Bernhard Dopheide (Ed.), **Hörerziehung**. Darmstadt: Wissenschaftliche Buchgesellschaft, 1977.
Manfred Teiner, "Das Ohr hat ganz erstaunliche Reserven - Österreich: Diskussion um Hörerziehung als gleichberechtigten Teil der Pädagogik" in **Neue Musikzeitung**, 31/3 (June/July 1982) p. 21.
Dankmar Venus, **Unterweisung im Musikhören.** Wuppertal: A. Hein, 1969.

heard.[14] In the *Comprehensive Musicianship* approach in the United States of America, it was demanded that performance should form the core of analytical, evaluative and conceptual processes that lead to an understanding of music literature.[15] Also acknowledged and challenged during this period was the fact that mankind lives in a visually orientated age.

Although *Aural Education* ("Hörerziehung"), *Comprehensive Musicianship* and *Aural Training* are not directly linked, all three subjects have their roots in the same philosophy of understanding music through auditive awareness. According to Michael R. Rogers, educators in the United States of America are increasingly interested in all aspects concerning Aural Training.[16] One can therefore state with certainty that there is an increase in the importance of the role that the ear plays in music education in general, and more specifically, a growth in the acknowledgement of Aural Training.

1. NECESSITY FOR THE RESEARCH; ITS THESIS AND PURPOSE

As is the case in most other research endeavours in disciplines other than music, research in the field of Aural Training emphasises isolated facets of the discipline. Investigations frequently concentrate on didactical approaches, music psychological issues and phenomena such as perfect pitch, tone deafness and chromesthesia. Such "microscopic" research procedures should not be criticised, because Music Education in general surely benefits from them.

However, the **need** also exists to examine the Aural Training domain in a broader sense, considering all its different aspects in a "stock-taking" process. Such an "inventory" approach has primarily diagnostical worth. Meaningful recommendations for changes in curriculum planning and teaching approaches can only be made if one has an overall view of the contents and structure of this field. The following are reasons why Aural Training can benefit from the results of this research:

(a) Current didactical trends can be distinguished and problem areas regarding teaching principles and curriculum planning can be uncovered.

(b) The influence of the following factors on the didactics of Aural Training can be examined:
  - (i) published and unpublished teaching materials,
  - (ii) research about Aural Training and other related disciplines
  - (iii) computer-assisted software

(c) "Inherited" instruction methods and unpublished information on Aural Training can be explored.

(d) General impressions of, and assumptions about, the subject can be investigated.

(e) Recommendations can be made for more successful ways of teaching Aural Training.

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14 Rudolf Frisius, "Musikunterricht als auditive Wahrnehmungserziehung" in Egon Kraus (Ed.), **Musik in Schule und Gesellschaft: Vorträge der neunten Bundesschulmusikwoche Kassel 1972.** Mainz: B. Schott and Sons, 1972 pp. 156-167.

15 John Buccheri, "Musicianship at Northwestern" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 127.

16 Michael R. Rogers, "Editorial: Trends and Issues in Music Theory Teaching" in **Journal of Music Theory Pedagogy**, 1/2 (Spring 1987) pp. 2-3.

The **thesis** of this study is that a more internationally orientated overview of the field of Aural Training is lacking. Meaningful recommendations for effective and necessary changes in the planning and instruction of Aural Training can only be made if such an overview is available.

With the intent of improving music pedagogy, the **purpose** of this research is therefore primarily to develop an understanding of the general state of Aural Training as presented at a tertiary level in 1991. Secondary to this purpose, recommendations for a theory towards Aural Training are made.

2. METHODOLOGY

In order to present an overview on the state of Aural Training, the study is divided into two sections. An in-depth **theoretical** survey on the didactics and teaching methods of Aural Training is conducted in the first section (Chapter Two).

The second section (Chapter Three), attempts to describe objectively the state of Aural Training in three countries by means of a **practical** questionnaire-based survey, thus forming the empirical part of the research.[17] Three hundred randomly selected Aural Training lecturers, teaching at tertiary institutions located in the Republic of South Africa, the Federal Republic of Germany and the United States of America, are included in this survey. This was done in order to (a) measure the extent to which some didactical approaches, described in Chapter Two, are reflected in syllabi, and (b) to assemble unpublished methods and approaches.

Personal interviews with lecturers at German *Musikhochschulen*, as well as observations and experiences of the ways in which Aural Training is presented at different *Musikhochschulen*, form part of the practical investigation. The collected information is not presented in an autonomous section, but is used to add to, and to interpret, the data collected by means of the questionnaire.

With the picture on the state of Aural Training outlined, a third section (Chapter Four) contributes suggestions for an **improved approach** to Aural Training.

3. LIMITATIONS

A few limitations occur with regard to the use of a questionnaire as data-collecting instrument, and the limited availability of some research material such as dissertations, books and computer software.

Due to the restriction on the length of a questionnaire-based survey, an unavoidable bias exists because all the questions concerning Aural Training can never be included in one questionnaire. Another questionnaire with different questions would emphasise other aspects of Aural Training. The questions thus have an influence on the information provided by the answers.

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17 Objective in this context means that statistical procedures were involved in the survey.

In order to examine thoroughly the state of Aural Training in the abovementioned three countries, it was also necessary to explore appropriate literature. This proved to be problematic because the latest publications of dissertations and other literature written in the United States of America were difficult to obtain in Germany.[18] Interlibrary services only functions within the European borders. In many cases only abstracts of dissertations were available.

Furthermore, only a restricted examination of Aural Training computer programs was possible. As it was unrealistic to purchase all the different Aural Training software, the researcher often had to depend on so-called demonstration disks supplied by only a few distributors.[19] Computers and software have been developing at lightning speed and become outdated quickly.[20] Also, of more than thirty letters written to retailers, fifteen were returned "address unknown", which could indicate that there is a substantial "turnover" in software retailers. Another less likely explanation for this could be that the addresses given in certain directories are faulty.

These restrictions, however, did not have a significant influence on the research, which could still be completed as planned.

4. REVIEW OF RELATED RESEARCH AND LITERATURE

Little research has been done on the general state (the why, what, how and where) of Aural Training. Only a limited number of surveys could be found on this topic. The majority of investigations into curriculum planning and teaching materials used were completed in the United States of America (USA). No such investigations could be found in the Federal Republic of Germany (FRG). Although two surveys on the contents of external aural examination syllabi were conducted in the Republic of South Africa (RSA), no study of the contents and methods of undergraduate Aural Training offered at universities could be found.[21] No comparative study on the curricula of the RSA, FRG and the USA could be traced.

The researcher attempts to conduct, amongst other things, a comparative study on the curricula of the above countries. This is the major difference between this enterprise and all other investigations introduced in the following pages.

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18 The researcher was based in the Federal Republic of Germany during the time in which this research was completed.

19 William R. Higgins lists more than fifty different Aural Training programs in his **Computer Applications in Music Education for the Apple II Series, Macintosh, & IBM Microcomputers.** Grantham, Pennsylvania: Higgins, 1990.

20 One retailer, for example, mentioned that the specific program referred to, was published in the 1987 catalogue and was not available anymore!

21 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987.
S. Paxinos, "Examination Ear Tests" in **Musicus**, 15/1 (1987) pp. 14-21.

4.1 Research on Aural Curriculum Planning

Six investigations into the state of various aspects of curriculum planning could be found and they are chronologically presented here.

The first survey to be discussed is the project *Research into Applied Musical Perception (RAMP)*, in which George Pratt, Michael Henson and Simon Cargill examined Aural Training in the first year of tertiary education at the music department of Huddersfield Polytechnic in 1985. They first investigated music students' attitudes towards Aural Training at various tertiary institutions and then sampled the contents of Aural Training courses at several institutions. Against this background of collected information, a tertiary first-year course was devised and incorporated into the music curriculum at the Huddersfield Polytechnic.

No information was available on the methodology of the two surveys. Neither in their article *Aural Teaching in the First Year of Tertiary Education: An Outline for a Course*, nor in their book *Aural Awareness: Principles and Practice* was it explained how the data on students' attitudes and curriculum contents were collected.[22] Curriculum contents of institutions in the United Kingdom most probably formed the core of this examination. The described 'basic diet' of conventional aural examinations very much resembled the contents of the syllabi of *The Associated Board of the Royal Schools of Music* and *Trinity College of Music.*[23]

Results of the surveys showed that students were largely dissatisfied with their Aural Training, seeing much of it as irrelevant to their musical needs. Regarding the contents of courses, most were strongly biased towards pitch and rhythm dictation, with less attention given to other musical parameters such as

- the range and tessitura of instruments and voices
- the density and the distribution of sounds and the textures within which they are performed
- the range of timbral colours, of dynamics, articulations and phrasing of which they are capable
- where sounds are positioned in space and how they relate to each other structurally
- above all, the variations in pace at which all these elements may occur.

The authors maintained that the balance should be redressed and that attention should be focused on the neglected elements of musical expression. The first-year course that crystallised from their findings was based on the principle that "'aural' training teaching should be concerned with relevance, with teaching skills that performers, composers and active listeners actually use in their daily musical lives."[24]

Twelve different teaching areas were outlined in their course addressing, amongst others, less conventional methods such as the elements of musical expression, timbre, the role of criticism, structural hearing, imaging and improvisation. The form in which the contents was taught embodied three processes, namely lecturing, discussing and practical

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22 George Pratt and Michael Henson, "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) pp. 115-137.
George Pratt, Michael Henson and Simon Cargill, **Aural Awareness: Principles and Practice.** Milton Keynes: Open University Press, 1990.

23 The Associated Board of the Royal Schools of Music, **Aural Tests Part I-IV.** London: ARSM, 1972.
Trinity College of Music, **Sample Ear Tests.** London: Trinity College of Music, [n.d.].

24 George Pratt and Michael Henson, "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) p. 115.

activity, which included 'do-it-yourself' elements. Aims and intentions, concepts and methods were explained to the students by means of an informal kind of lecturing. During the discussion sessions, students could share experiences, ask questions and pursue topics. Because of the fact that conventional Aural Training often proved to be a 'one-sided' affair, dominated by piano dictation with the teacher 'feeding' material to the students, performance on their own instruments and singing formed an important part of the newly devised syllabus.

Although the above surveys of Pratt et al. concentrated on tertiary curriculum planning, they were limited to the United Kingdom and fall outside of the researcher's set geographical boundaries. Their teaching principles and suggestions can, however, be fruitfully applied and incorporated into the researcher's model for improved Aural Training presented in Chapter Four.

A second curriculum-based survey was undertaken by the researcher in 1987.[25] The contents of, and the music examples given in, the auraltest syllabi of the *University of South Africa, The Associated Board of the Royal Schools of Music* (United Kingdom) and *Trinity College of Music* (United Kingdom) were examined and evaluated.[26] In order to evaluate the content validity of the tests, a taxonomy of the objectives of Aural Training was constructed. Learning process theories such as concentration, age requirements and memory abilities, as well as Bloom's taxonomy of educational objectives, were built into the taxonomy. This formed the major component of the evaluation process, serving as a criterion to which the examination requirements of the three institutions were compared.

An empirical element was introduced, in that the construct validity of the UNISA Grade Four aural tests were examined, and the results correlated with the results obtained in a modified version of the first three tests of Richard Collwell's *Music Achievement Tests*.

It was concluded that certain parameters such as dynamics, timbre and texture were neglected in the Aural Training domain, with most emphasis placed on pitch and duration. Only selected attributes of the pitch and duration parameters were included, while aural awareness of phrasing, articulation, agogic nuances and tempo were ignored. Music examples from the Baroque and Classical style periods mainly were used as teaching and testing material, whereas music from the twentieth century was totally absent. Little approximation between the contents of Music Theory syllabi and the Aural Training syllabi existed. Children and students were underestimated and exposed to tests that did not comply with their internal learning potential. The systematic build-up of course objectives and teaching methods proved to be inadequate.

Although a general examination of the contents of the Grade VIII and Licentiate syllabi, which showed some similarity with tertiary syllabi, was included, a need still exists to explore tertiary South African curricula in depth. Apart from the empirical investigation which included only UNISA Grade Four pupils, the content validity of the rest of

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25 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987.

26 University of South Africa (UNISA), **Practical Musicianship (Aural Tests) Appendix B, Written Examination Syllabuses.** Pretoria: UNISA, 1985.
Practical Musicianship Grades 1 - Licentiate. Pretoria: UNISA, [n.d.].

the syllabi was not statistically questioned. German and North American curricula contents were not included in the survey.

A third survey with the same purpose of examining the Aural Training syllabi of the *University of South Africa, The Associated Board of the Royal Schools of Music* and *Trinity College of Music* was completed by S. Paxinos in 1987.[27] No statistical procedures were involved. The results corresponded with the results obtained in the above investigation. Paxinos recommended the creation of standardised tape-recorded examinations with written responses in order to minimise the interference of examiners' personal idiosyncrasies.

Fourthly, during the *Second Institute for Music Theory Pedagogy Studies* (Boulder, Colorado 1989) a questionnaire-based survey was administered to the eighty-seven participants, mostly undergraduate theory teachers.[28] The purpose was to collect information about, and gain insights into, the teaching of Music Theory in the undergraduate curriculum. Questions regarding Aural Training entrance and final examination requirements, computer-assisted instruction, teaching methods, curriculum planning, etc. were posed amongst other questions on written Music Theory skills.

Responses revealed that the moveable doh method was used by 44% of all the participants, with scale degree numbers the second most used method (22%). Ninety-one percent did not make use of Kodály hand-signals in conjunction with sight singing, whereas 69% used a conducting pattern in conjunction with sight singing. Textbook materials for sight singing were used by 91% of the participants. Examples from the literature were placed second (52%), and materials composed by the teacher third (44%).

At the end of the theory course in sight singing, 62% of the participants indicated that students were expected to sing at sight a melody which modulated to a common related key. Only 18% indicated that sight singing of a melody with no tonal center was required. As to other final examination requirements, the results were as follows:

- write two or more parts of a four-part choral-style phrase which includes some chromatic harmony or modulation (73%)
- identify phrase relationships (53%)
- write a two-phrase melody containing chromaticism (50%)
- write two or more parts of a four-part chorale-style phrase which includes only diatonic harmony (33%)
- write a transcription from a recording (8%).

With regard to computer-assisted instruction, 57% of the participants required this type of instruction along with their Music Theory curriculum. Computer assignments were monitored (a) by the instructor checking individuals (28%), (b) occasionally in class (26%) (c) by other methods (24%).

Responses of the conference participants were, however, not representative of the whole population of Aural Training lecturers located in the USA and the results and conclusions can therefore not be generalised. Participants were not randomly selected, but decided themselves to attend the conference or not.

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27 S. Paxinos, "Examination Ear Tests" in **Musicus**, 15/1 (1987) pp. 14-21.

28 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 243-253.

A fifth survey conducted during 1990 was that of Randall G. Pembrook and H. Lee Riggins. They aimed to provide Aural Training teachers with information on current methods and materials for teaching aural skills in colleges and universities in the USA.[29] In order to also identify changes in the teaching of Aural Training over the last decade, a comparison of the results with earlier studies done by Collins and Killam et al. was included by them.[30]

A questionnaire was sent to all co-ordinators of Music Theory at 908 colleges and universities in the USA that offer any type of Bachelor's degree in music. The questions were designed to gather information on organizational approaches, material used for sight singing and dictation purposes, methods used to teach sight singing and error detection, time divided between sight singing, dictation, error detection and recognition/identification, as well as the extent to which computer-based instruction was incorporated into Aural Training.

The response rate was 37% (336 institutions, representing 45 states). Sixty percent of the respondents scheduled separate classes for Aural Training. The majority of respondents indicated that 100 minutes per week was spent on instruction for both freshmen and sophomore classes. *Music for Sight Singing* by Robert W. Ottman (2nd edition 1967), *A New Approach to Sight Singing* by Sol Berkowitz, Gabriel Frontrier and Leo Kraft (1976), and *Sight Singing Complete* by Bruce Benward, (4th edition 1986) were the three principal sources used for sight singing. In this respect the results supported the outcome of the research by Collins and Killam. As in the survey of the *Second Institute for Music Theory Pedagogy Studies*, the movable doh method proved to be the most preferred method used in the USA. Benward's *Ear Training: a Technique for Listening* (2nd edition 1983) was the foremost text used for dictation and error detection. Time-wise the least attention was given to error detection. Seventy one percent of the respondents made use of some form of computer-assisted aural instruction. *Harmonic Dictator* by Temporal Acuity Products was the most used software and the Apple II series the most used computer.

The main difference between the researcher's endeavour, the *Second Institute for Music Theory Pedagogy Studies*, and Pembrook and Riggins's survey lies in the fact that the latter two were limited to the USA. Similarities between the two abovementioned surveys and the questionnaire compiled by the researcher are: (a) the questionnaires were completed by undergraduate lecturers, (b) certain questions had the same contents, and (c) the answers were analysed by statistical means. The results gathered at the *Second Institute for Music Theory Pedagogy* conference, as well the results of Pembrook and Riggins are compared with the outcome of this research to interpret thoroughly the state of Aural Training in the USA in Chapter Three.

The last survey to be discussed on the state of Aural Training was completed by Shey-Tzer Yao in 1990. The purpose of his study was "to conduct a review of the effectiveness, as perceived by the students, of the aural skills curriculum required of all music majors in two post-secondary institutions in Taiwan ... in order to make recommendations for

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29 Randall G. Pembrook and H. Lee Riggins, "Send Help!": Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 231-240.

30 Irma Collins, **Current Attitudes and Trends in the Teaching of Sight Singing in Higher Education.** D.M.A, Temple University 1979; and Rosemary Killam et al., **Survey and Results: Most-Used Theory Texts in U.S. Colleges and Universities.** The University of North Texas, 1987, both quoted by Pembrook and Riggins.

improvement."[31] Apart from the use of a questionnaire to ascertain students' perception of instruction programmes in relation to a number of selected, categorised programme aspects, Yao also studied the curricular content as prescribed by the *National Taiwan Ministry of Education*, and as interpreted by the teachers at the *National Taiwan Normal University* and the *National Institute of the Arts*. Furthermore, a study of evaluation techniques and outcomes, initial placement tests and student progress was included.

The response rates of the two institutions included in the survey were respectively 60% and 51%, with a high degree of positive correlations between responses from both ($r = 0.86$). Respondents were chosen on a voluntarily basis. Findings revealed the following information:

- efficiency of the use of ability groupings (91.1%)
- perceived validity of the initial placement tests (67.3%)
- understanding of the programme's instructional goals and objectives (52.8%)
- satisfaction regarding instructional content (47.7%)
- adequacy of the teaching strategies (47.5%)
- satisfaction of evaluation techniques (45.4%)
- students were least satisfied with aspects regarding the course scheduling and duration.

Recommendations were made for a revised Aural Training curriculum and for a revised initial placement test, with sections regarding clarification of objectives and suggested classroom strategies.

The main differences between the investigation of Shey-Tzer Yao and the researcher's endeavour lie firstly in the fact that Yao conducted his research in Taiwan only, and secondly that questionnaires were addressed to students and not to lecturers of Aural Training.

4.2 Articles, books and congress reports on curriculum designs at selected tertiary institutions

In the previous section "formal" empirical and/or analytical investigations were discussed. This section briefly describes "informal" articles and books written, as well as lectures read, based on Aural Training lecturers' observations made at the institutes where they taught. Empirical procedures were, with a few exceptions, not involved and general statements were made not only on the curriculum of an institution, but in some cases also on trends recognised in a country.

In his article *Teaching Music Theory: The European Conservatory*, Per-Gunnar Alldahl commented on Aural Training methods used at the **Stockholm Conservatory of Music**.[32] Alldahl stressed the importance of scrutinizing and revising Aural Training strategies because of their influence on all music activities.

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31 Shey-Tzer Yao, **The Aural Skills Development Program in Music Departments of Two Post-Secondary Institutions in Taiwan: Status and Recommendations**. Doctoral dissertation, Ball State University 1990. Ann Arbor, Michigan: University Microfilms International, 1990.

32 Per-Gunnar Alldahl, "Teaching Music Theory: The European Conservatory" as translated by Bo Alphonce in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 111-123.

Aural Training at the Stockholm Conservatory of Music consisted of four to six students grouped together in one class per week over a period of four to six semesters. Students were requested to bring their instruments along. Emphasis was placed on three areas:

- repetition (playing back a heard musical phrase), playing by ear, and improvisation
- sight reading and dictation
- formal and structural hearing.

Alldahl criticised traditional Aural Training for being limited to neutral and isolated material without advancing to music as a whole. According to him, the point of departure had to be the use of selected compositions treated as musical entities and chosen because they represented certain characteristic rhythms, melodies and/or harmonies. Apart from material from the music repertoire, *Laerebog i Rytmelaesning* (Sight-Reading Rhythm) by Jörgen Jersild, *Modus Novus* by Lars Edlund and folk-songs were used as teaching/study material.

Robert Gauldin described the teaching of **Music Theory at conservatories**, concentrating on Aural Training, creative work and performance analysis.[33] He listed five basic aural skills:

- the conversion of sound to symbol, i.e dictation
- the conversion of symbol to sound, i.e. sight singing
- the comparison of sound to symbol, i.e. error detection
- the conversion of symbol to imagined sound, i.e. inner hearing
- immediate reproduction in sound of a previous sound source.

According to Gauldin, dictation and sight singing were traditionally associated with Aural Training, with 'immediate reproduction in sound of a previous sound source' the least explored skill. A few problems surrounding the didactical aspects of Aural Training were also addressed. Aural comprehension of musical phrases was, for example, absent and a 'note-to-note' dictation procedure was often followed with students adding a few more notes every time the example was played. The student started to work at a detailed level without considering broader aspects of the passage in question. Aural analysis, also implying 'oral analysis', was prescribed as a remedy for this problem. At an introductory level students could comment orally on temporal and tonal (melodic and harmonic) aspects, articulation, dynamics, texture, timbre and structural processes. With this information, the student would first be able to construct the outline of the passage and then move on to a more detailed phase.

During the **D-A-CH conference** in 1976 a few of the papers read referred to aspects of aural curriculum planning. Roland Mackamul discussed non-musical circumstances that influenced the methods of Aural Training.[34] According to him, two main requirements for successful teaching were absent in the FRG. First of all, a well thought-through education system, starting with Aural Training at a very young age, was needed. Secondly, teachers with sound pedagogical Aural Training credentials were required.

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33 Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 75-90.

34 Roland Mackamul, "Effektivitätsmindernde Faktoren im Bereich der Gehörbildung" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 15-18.

Because of the disregard of these requirements, the starting level of Aural Training at *Musikhochschulen* was based on rudimentary elements. In order to solve these problems, Mackamul recommended that centrally located music schools should include preparatory Aural Training courses in their curricula, and the opportunity of choosing Aural Training as a second major subject would help to prevent the employment of uninterested lecturers.[35]

Regarding teaching procedures, Mackamul briefly reported on his experiences of *individual* Aural Training classes at the *Musikhochschule* in Stuttgart. Twenty minutes per week were available to every student in 1977 (1992: thirty minutes). Lecturers, however, could freely organise students in smaller groups in longer lessons. Mackamul warned against the merging of Music Theory ("Tonsatz") and Aural Training classes, because aural skills normally develop at a slower pace than written Music Theory skills.

Peter Wettstein reported on the Aural Training system used at the ***Musikhochschule* in Zürich**.[36] Three goals were distinguished, namely to develop

- analytical hearing as well as the ability to transform what is heard into symbols or notation
- inner hearing
- precision schooling regarding rhythm, intonation, dynamics and timbre.

With these goals in mind, the obligatory Aural Training curriculum was divided into different levels: elementary levels ("Unterstufe") one and two, intermediate levels ("Mittelstufe") one to four, and the advanced level ("Oberstufe"). The latter course emphasised the various skills required by conductors, Music Theory majors, etc.

Students were placed in different levels after the entrance test and grouped in classes of eight to twelve. After an average of seven semesters the final examination, complying with the difficulty of the intermediate level four, was taken. Apart from the compulsory aural classes twice a week, other non-mandatory classes were available to students. They also had access to a programmed audiocassette-based Aural Training course located in the music library. The efficiency of this audio course was tested with positive results.

Regarding didactical concepts, students were recommended to attend a "solfège" choir course during the first two semesters, in which sight singing was stressed. The domination of the piano sound was broken in favour of other timbres, including electronic sounds. Emphasis was placed on memory as a way of developing analytical skills. Dictating a simple musical phrase as a whole from memory was preferred over dictating a more difficult phrase in a measure by measure approach. Music material was drawn from as many different style periods as possible. The development of inner hearing was enhanced by the programmed audiocassette course. In this course, recordings of small and larger choral and instrumental chamber music were made with built-in discrepancies between notation and sound. Attention was not focused solely on sight singing, rhythmical and harmonic dictation, but other aspects such as timbre, dynamics, intonation, form and style were also taken into consideration.

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35 In the German music-education system, children and adults interested in playing an instrument can learn this at an extra-curricular school called the "Musikschule".

36 Peter Wettstein, "Gehörbildungsunterricht an der Musikhochschule Zürich" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 23-25.

The structure of the Aural Training curriculum at the ***Musikhochschule*** **Saarland in Saarbrücken** described by Hans Lonnendonker, resembles the abovementioned curriculum[37]. Weaker students who failed the entrance test were given the opportunity to attend preparatory classes before repeating the test. Books written by Roland Mackamul and Monica Quistorp were used together with French solfège methods, not including absolute solmisation.

A short summary of the contents of Music Theory and Aural Training **entrance requirements at Musikhochschulen**, conservatories and church music schools in the FRG, was presented by Werner Müller-Bech.[38] According to him, the contents were more or less the same in the 28 schools examined, with aural recognition of intervals, rhythms, chords, dictation and sight singing included.

Music Theory and Aural Training were combined in 1974/75 to form a subject called Musical Foundation Training ("Musikalische Grundschulung") at the ***Musikhochschule*** **Graz in Austria**.[39] The main idea behind this combination was to provide students with practice models which could be applied in musical professions. Objectives were to develop listening abilities, to "de-abstract" Music Theory, and to develop the ability to associate notation and sound with each other. Books by Paul Hindemith and Roland Mackamul were frequently used.

In his book **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies**, Michael R. Rogers attempted to summarise and compare trends that had an affect on college-level theory teaching in the USA during the 1980s.[40] Special emphasis was placed on examining the philosophies and assumptions behind textbooks, materials and technologies as well as on comparing teaching approaches and concepts. Contents included the educational objectives of Music Theory, philosophical orientations, mind training, analysis, Aural Training and teaching techniques.

It is often difficult to distinguish between Roger's summary, comparison and criticisms of teaching approaches, and his recommendations made for better teaching circumstances and methods. But little information was given on the actual state of Aural Training especially in his chapter concerning 'Ear Training'. The value of Rogers's general observations lies primarily in his recommendations for certain teaching approaches to and theories on towards Aural Training. He suggested that an integration between the conceptual and perceptual components of students' training

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37 Hans Lonnendonker, "Musiktheoretisches Grundstudium an der Musikhochschule des Saarlandes in Saarbrücken" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 47-51.

38 Werner Müller-Bech, "Anforderungen bei den Aufnahmeprüfungen der Musikhochschulen in der Bundesrepublik Deutschland bezogen auf die Musiktheorie und Gehörbildung" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 43-46.

39 Wolfgang Messer, "Musikalische Grundschulung an der Hochschule Graz" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 55-57.

40 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984.

must take place. In describing the inseparable cohesion between thinking and listening, Rogers maintained that the more one thinks, the more one hears, and vice versa, referring to this phenomenon as the *understanding* ear and the hearing *mind*. Many dictation and sight singing texts as well as research projects were criticised for focusing solely on drill-and-repetition aspects. In this approach no distinction was made between sound events (requiring just ears) and musical events (requiring mind and ears). More interpretative hearing situations tended to be ignored in favour of absolute right and wrong answers. Teachers sometimes eliminated longer musical examples from Aural Training programmes, because they did not fit the "preselected category of 'problem-with-neat-solution'." Rogers, on the other hand, recommended:

> "...an approach to ear training that brings the full underpinnings of analytical modes of thought into play because such an approach is both pedagogically sound - making the job easier through reinforcement with conceptual supports - and because it is musically sound. Structural hearing that grows out of organizational principles and psychological processes of the mind and music is the only way that music or music study makes sense... ."[41]

In the **Journal of Music Theory Pedagogy** a series of articles on specific university-level theory programmes of the *San Diego State University, New England Conservatory of Music, Indiana University* and *Northwestern University* were published. Details concerning the historical background, overall goals, course outlines, contents and methods of the different Music Theory disciplines were broadly described.

David Ward-Steinman gave an overview of the three-year Comprehensive Musicianship programme followed at the **San Diego State University**.[42] With the primary objective of teaching students to deal intelligently with all kinds of music by means of an *integrated* teaching approach, emphasis was placed on composition, analysis, aural skills and classroom performances. Courses included harmony, 'ear' training, sight singing, both sixteenth- and eighteenth-century counterpoint, form and analysis, arranging and orchestration, composition, improvisation, conducting and ensemble performance. Music literature from all historical periods as well as non-Western music from African, Indian and Asian cultures was covered. What is important is the fact that all these courses were taught comprehensively in relation to each other.

Eight overall goals were distinguished, for example: to recognise at sight (notation) or by sound (live or recorded) specific instances of topics studied when presented in new, unfamiliar contexts or compositions; to improvise in a given style; to be able to function alternatively as conductor, performer, coach, editor or arranger of material for class use and study; to be able to dictate melodies; to sight read and sight sing with fluency and musicianship, also concentrating on matters such as tempo, dynamics and phrasing.

There were two approaches to Aural Training and sight singing at the university, although the goals to be achieved were the same. Some teachers used a programmed language laboratory approach, while others used the music literature for their exercises. Unique aspects of the Comprehensive Musicianship programme included sight singing

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41 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 101, 103-104.

42 David Ward-Steinman, "Comprehensive Musicianship at San Diego State University" in **Journal of Music Theory Pedagogy**, 1/2 (Fall 1987) pp. 129-147.

sessions with classes combined to form a chorus and orchestra to sight read works from different periods. The contents of improvisation classes included phrase improvisation, the completion of antecedent-consequent pairs, the use of different modes, ground-bass and chaconne patterns, as well as improvising different kinds of counterpoint to given lines, reading graphic scores, etc. Students who were interested in acting as teaching assistants had to register for *Comprehensive Musicianship Pedagogy*. Weaker students who failed the entrance test were advised to attend the *Basic Musicianship for Non-Music Majors*.

The value of the Comprehensive Musicianship programme was tested by means of experimental and control groups between 1967 and 1969. The experimental group who followed the Comprehensive programme surpassed the level of the control groups in every single case.

Sightsinging at New England Conservatory of Music is the title of an article written by Lyle Davidson, Larry Scripp and Joan Meyaard.[43] As the title indicates, all attention in the article was focused on sight singing. It was argued that a solfège programme is the doorway to developing a broad musical literacy in performance.

Three different aspects of the philosophy behind their sight singing programme were described. In the first part a description was given of music psychological principles from a developmental perspective, with references to the work of Feldman and Piaget. This served as a background for the ramification of sight singing skills. The growth of musical knowledge was presented as moving through three levels: *kinesthetic knowledge* (enactive fingering), *externalised knowledge* (singing to demonstrate musical intentions) and *internalised representation* (inner aural imagination). In the second part of the article, the pedagogical framework used for teaching purposes was based on a cognitive process model. Assessment models were presented in the third part.

The solfège programme followed at the New England conservatory consisted of four semesters (two years), with an additional advanced assistantship programme. Emphasis was placed on sight singing performances which included appropriate nuances and musical expression, as well as on problem-solving, rather than on memorising materials. A fixed doh policy formed the pedagogical basis with material taken from the music literature and more than ten different textbooks. The majority of books used were of French origin. Reading for example, psychology and music psychology as well as term papers formed an important part of the class work. Teaching assistants participated in a weekly pedagogy seminar, where topics such as videotapes and protocol analyses were used for group review and discussion. "Solfège parties" occurred occasionally during the semester where students had to sightread individually and in ensembles. More advanced students were grouped together to form a solfège orchestra providing the "orchestral accompaniment" for a soloist in a concerto!

The multiple assessment techniques introduced in the third and final part of the article included both quantative ("standardised departmental examinations") and qualitative analysis ("error analysis and classroom observations"). Profiles of errors could be constructed individually for all students, thus providing a diagnosis of strengths and weaknesses.

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43 Lyle Davidson, Larry Scripp and Joan Meyaard, "Sightsinging at New England Conservatory of Music" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 3-68.

The undergraduate core music curriculum at Indiana University, as sketched by Mary H. Wennerstrom, underwent two major theory curriculum developments during the 1960s and 1970s.[44] As a modified version of this second curriculum development was still in use, the curriculum of the 1980s and future plans were only briefly referred to. According to Wennerstrom, some of the basic ideas formulated during the 1950s were still practised in 1989. One of these convictions was that a strong emphasis should be placed on listening to music. Sight singing was not merely included for the sake of developing solfège ability, but rather to increase musical skills in performing and listening, as well as providing a way of demonstrating musical structure. Music examples had to be taken from a broad historical spectrum including, the twentieth century.

As a result of involvement in comprehensive musicianship projects, the core curriculum was changed in the 1970s. All musical skills (i.e. sight singing, 'ear' training and realizing of certain concepts at the keyboard) were put into separate courses, thus they could be evaluated individually. Contents were co-ordinated with theory and literature courses and were taken simultaneously with these.

Entrance examinations showed that over 70% of the prospective students did not meet the expected rudimentary aural and written requirements. In order to solve this problem, a remedial course was introduced in the 1980s which had to be taken concurrently with the first semester skills course. In order to help students realise the importance of skills courses, a minimum of a C grade has been required since 1979 in the four-semester Aural Training courses. The last course dealt exclusively with twentieth-century music.

Regarding teaching materials, *Studying Rhythm* by Anne C. Hall and *Music for Sight Singing* by Robert W. Ottman were commonly used. Each co-ordinator developed an organised set of materials for Aural Training and supplemental essentials. Taped materials and computer-assisted instruction were continually revised and expanded. Materials covered in the skills courses included meter/rhythm, clefs, scales/modes, intervals and melodic patterns, two-part, functional harmony (as well as '20th-century functional patterns') and chord types. Students received a great deal of guided practice by meeting four times a week, twice in large groups and twice in small groups, with the fifth day set aside for individual hearing and tutorials.

Guided listening assignments involving substantial musical excerpts were used successfully. The transfer of skills from isolated material to contextual listening was emphasised, and it was no coincidence that a work of considerable importance was written on this topic by Gary Wittlich (one of the staff members) and Lee Humphries.[45]

At **Northwestern University**, where a comprehensive musicianship teaching approach was followed, aural skills were taught in separate classes. John Buccheri indicated, though, that these skills were not intentionally combined with the study of Music Theory or History.[46] Analytical listening and singing were included in musicianship classes as a

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[44] Mary H. Wennerstrom, "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 153-176.

[45] Gary E. Wittlich and Lee Humphries, **Ear Training - An Approach through Music Literature.** New York: Harcourt Brace Yovanovich, 1974.

[46] John Buccheri, "Musicianship at Northwestern" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 125-145.

means of understanding the literature discussed or analysed. Yet actual skills of sight singing and transcription were developed in separate classes divided into six levels spread over a period of two years. Literature corresponding to the style period studied in the musicianship class was utilised.

The goals of this programme were to cultivate the students' ability to transfer aural skills to all areas of musical activity, and to provide them with knowledge of a broad repertoire of music. More specific objectives included the development of musical memory and inner hearing, transcription, selective listening and improvisation abilities. Computer-assisted Aural Training formed part of the curriculum.

Finally, David A. Damschroder, a lecturer at the **University of Minnesota School of Music**, pinpointed a severe problem with respect to theory classes when he wrote:

> "At most of the world's conservatories and universities, private instruction in performance is the norm. Students are offered engaging and appropriate repertoire chosen to accommodate their backgrounds, talents, and aspirations. Why, then, has this strategy been neglected in the teaching of music theory?"[47]

Seven themes were identified in his article, such as admission to a course, course schedule, diversification of homework, tests with options, banishing rigidity from grading, dealing with students entering the university, coping with students transferring from one university to another and students that graduate as well as 'rethinking skills training'.

Under the heading *Rethinking skills training*, the relationship between theory and aural skills in terms of academic credits and contact hours was discussed. Students earned three credits in theory and one credit in Aural Training. Damschroder, however, pointed out that the attainment of mastery of skills was much more important than the supposedly one-third credit given to it. As a result of this students tended to invest more time in theory than in Aural Training. This educational system produced degree-holding musicians who were not competent in the aural skills component of their musical training.

Recommendations by Damschroder included concurrent enrollment in first- and second-year courses for weaker students. Homework assignments on either audio tapes or with computer programs would, amongst other things, help to eliminate the piano-generated sound used during class. Sight singing assignments had to be given according to the ability of the student. He concluded:

> "Our ability to orient our instruction to individual needs profoundly influences our success in this endeavour. Indeed there is hope."[48]

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[47] David A. Damschroder, "Flexibility in the Theory Classroom: Strategies for the Management of Diversity" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 177.

[48] David A. Damschroder, "Flexibility in the Theory Classroom: Strategies for the Management of Diversity" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 187.

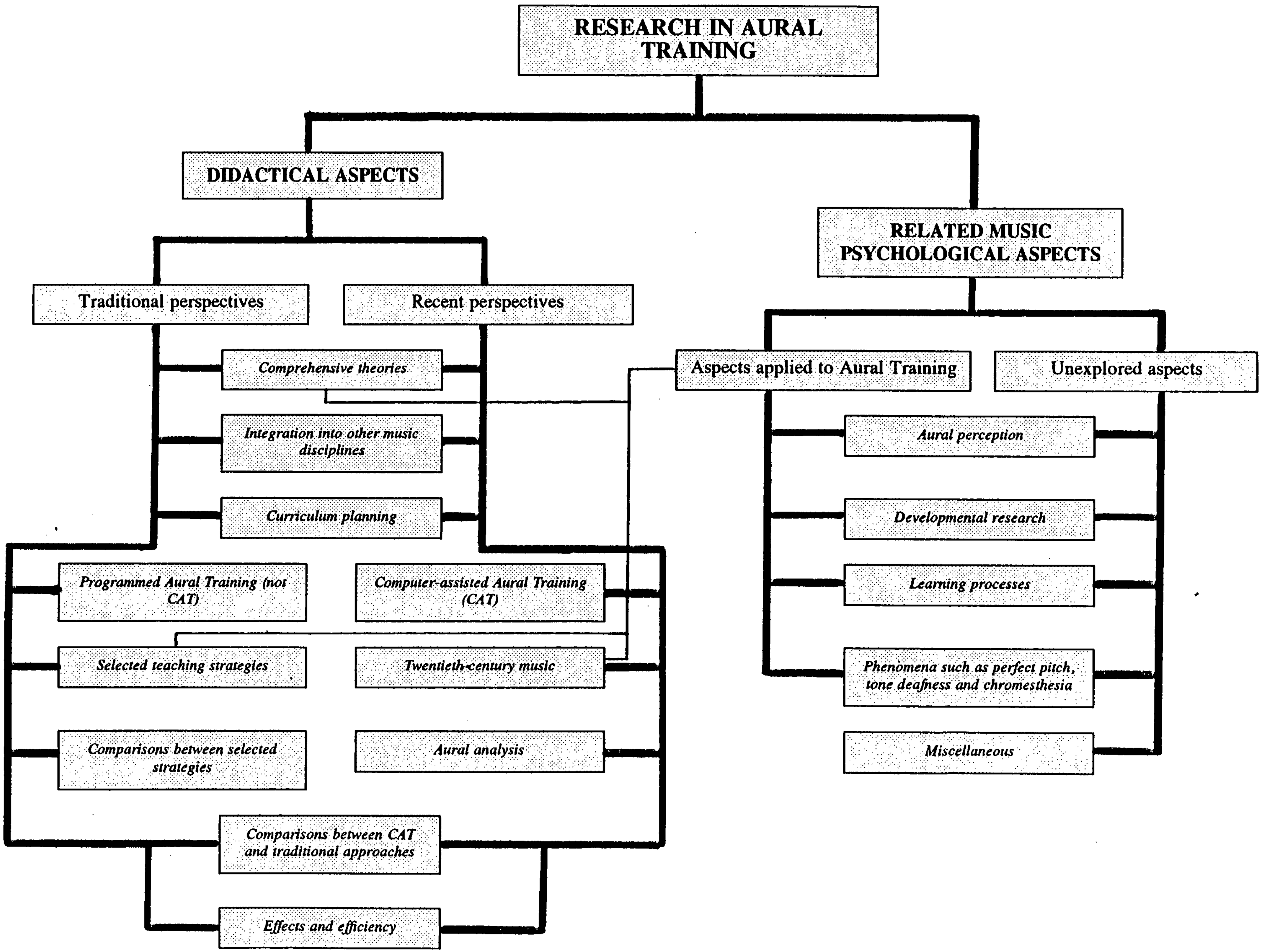
4.3 Overview of research in the field of Aural Training

As the purpose of this research endeavour is to sketch the general state of Aural Training, it seems logical also to undertake an overview of other investigations in the field that are not solely related to curriculum planning. In order to do so, all the located surveys have been classified and categorised. The sole goal of this section is to serve as an outline, and only a few exemplary titles are introduced in the discussion of each category. Results of individual investigations are not discussed but are referred to in Chapters Two, Three and Four, where appropriate. A list containing full titles and details of all the research is given in Appendix A.

The following diagram presents a summary of research topics. Because of the complex nature of Aural Training, only a few topics can be clinically placed in only one of the categories. Most of the categories are related to each other to some extent and, although the summarised diagram can be helpful to portray general trends, this dissection remains artificial. Interrelationships are indicated by fine lines, contrasting with the thicker lines used to indicate branching. In order to prevent confusion, the interrelationships between the didactical and related music psychological aspects columns only are indicated. Interrelationships between the individual categories within the didactical and related music psychological aspects columns are not indicated.

Research in Aural Training can be broadly divided into **Didactical Aspects** and **Related music psychological aspects**. Most research themes are grouped under the first heading, and although a few investigations include cognitive approaches (*Aspects applied in Aural Training*), **Related music psychological aspects** is still an unexplored area with little application of research results and theories to the teaching of Aural Training.

Fig. 1.1 Overview of investigations into Aural Training and related research



Under ***Unexplored aspects*** research, topics that could be worthwhile incorporating into Aural Training are listed. These can be subdivided into *Aural perception,*[49] *Developmental research,*[50] *Learning processes,*[51] *Phenomena such as perfect pitch, tone deafness and chromesthesia*[52] and *Miscellaneous*[53]. The list of investigations given in Appendix A, covering these unexplored topics, however, is just a small sample of all the research that could possibly be applied to Aural Training. As ***Aspects applied in Aural Training*** also refers to a lesser extent to the abovementioned music psychological principles, the first four categories are placed under both *Applied* and *Unexplored* aspects. Due to the intertwined nature of aspects applied, this distinction is, however, not made in Appendix A, and the few studies that were found are all grouped together under the heading of *Aspects applied to Aural Training*.

Research into **Didactical aspects** of Aural Training can be subdivided into ***Traditional perspectives*** and ***Recent perspectives***, with *Comprehensive theories*, *Integration into other disciplines*, *Curriculum planning*, *Comparisons between computer-assisted instruction and traditional approaches* as well as *Effects and efficiency* appearing in both categories. ***Traditional perspectives*** are *Programmed Aural Training (not Computer-assisted Aural Training)*, *Selected teaching strategies*, as well as *Comparisons between selected strategies*. These perspectives are traditional in the sense that the explored topics concentrate mainly on methods used since at least the beginning of the twentieth century, with little attention given to the use of electronic devices and the application of music psychological principles. Audiocassette programmed Aural Training is the youngest "traditional" method applied and preceded Computer-assisted Aural Training.

Computer-assisted Aural Training, the incorporation of *Twentieth-Century Music* as well as music psychological influences noticeable in *Aural analysis* are all grouped together as ***Recent perspectives*** that have been progressively in use for the past twenty years. The youngest of these three is Aural analysis, which has not yet fully matured as a research subject.

Regarding *Comprehensive theories*, the work done by Emily Ruth Brink and Richard Douglas Ashley[54] counts amongst the few studies on this topic. Both strove towards an extensive approach in the development of general aural

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49 Hans-Reinhard Biock, **Zur Intonationsbeturteilung kontextbezogener Intervalle.** Regensburg: Gustav Bosse, 1975.

50 David J. Hargreaves, **The Developmental Psychology of Music.** Cambridge: Cambridge University Press, 1986.

51 Peter R. Webster, "Conceptual Bases for Creative Thinking in Music" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987.

52 Eva Marie Heyde, **Was ist absolutes Hören? Eine musikpsychologische Untersuchung.** München: Profil, 1987.

53 Marianne Hassler, **Musikalisches Talent und räumliche Begabung.** Doctoral dissertation, Eberhard-Karls-University Tübingen 1984. Tübingen: Bölk, 1984.

54 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980.
Richard Douglas Ashley, **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

skills, with much emphasis placed on the music psychological principles of cognition. Brink's theory crystallised in an applied Music Theory programme, with aural and analytical training viewed as complementary components, whereas Ashley's theories led to the development of a computer program.

Integration into other disciplines is put in both the *Traditional and Recent perspectives* categories, because of the auditive nature of music. The ear plays a role in every facet of music, but it is only recently that this integration has started to function on a conscious level. The move away from a merely fragmented approach to a more holistic way of teaching aural skills emphasises the importance of integration. Bernita Douglas, for example, provided guide-lines for an integrated approach to piano teaching in her thesis.[55]

Surveys of *Curriculum planning* were discussed in sections 4.1 and 4.2. and are therefore not mentioned here. Research concerning the use of audiocassettes and other not computer-based devices are combined under *Programmed Aural Training*. The work done by Nancy Marie Bodenstein and James C. Carlsen serve as examples of this type of research.[56] "Identifying successful dictation strategies" by Gary Potter was placed in the category *Selected teaching strategies*.[57] Three different instructional strategies for interval learning were surveyed by James J. Canelos, Barbara A. Murphy, Ann K. Blombach and William C. Heck, in research categorised as *Comparisons between selected strategies*.[58]

A lot of research has been done in the field of *Computer-assisted Aural Training (CAT)* since the late 1960s. The work done by Wolfgang E. Kuhn and Raynold E. Allvin as well as by Fred T. Hofstetter are amongst the earliest approaches to CAT, with the research by Russell A. Kozerski as one of the more recent approaches to this fast developing field.[59] Hilda Bester explored the incorporation of *Twentieth-century Music* to Aural Training in her thesis.

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55 Bernita Douglas, **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig.** Unpublished Master's thesis, University of Stellenbosch 1990.

56 Nancy Marie Bodenstein, "The Teaching of Selected Musical Concepts in the College Music Survey Course Utilizing the Taped Guided Listening Technique" in **Dissertation Abstracts International**, 36/3 (September 1975) p. 1362-A.
James C. Carlsen, "Programed Learning in Melodic Dictation" in **Journal of Research in Music Education**, 12/2 (1964) pp. 139-148.

57 Gary Potter, "Identifying Successful Dictation Strategies" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 63-71.

58 James J. Canelos, Barbara A. Murphy, Ann K. Blombach, and William C. Heck, "Evaluation of Three Types of Instructional Strategy for Learner Acquisition of Intervals" in **Journal of Research in Music Education**, 28/4 (1980) pp. 243-249.

59 Wolfgang E. Kuhn and Raynold E. Allvin, "Computer-Assisted Teaching: A New Approach to Research in Music" in **Journal of Research in Music Education**, 15/4 (1967) pp. 305-315.
Fred T. Hofstetter, "Computer-Based Aural Training: The Guido System" in **Journal of Computer-Based Instruction**, 7/3 (February 1981) pp. 84-92.
Russell A. Kozerski, **Personal Computer Microworlds for Music Composition and Education.** Doctoral dissertation, University of California, San Diego 1988.

In a cognitive-based investigation, Elizabeth West Marvin generalised the contour theories of Robert Morris within a non-tonal musical context.[60]

Research in *Aural analysis* is still an unexplored field. Although Robert Gauldin referred to this aspect of auditive learning, his contribution merely lay in a "microscopic" application of this principle. Form analysis still needs to be investigated with emphasis placed on the "whole" instead of musical phrases (thus "macroscopic"). Gary Potter has explored this area in an aural analysis project, and Emily Ruth Brink compiled a taxonomy of Aural tasks based on the principle of aurally analysing "whole" compositions.[61]

A few investigations such as Janet Claire Garton's "The Efficacy of Computer-Based and Tape-Recorded Assistance in Second-Semester Freshman Ear Training Instruction" have concentrated on *Comparing CAT and traditional teaching approaches*.[62] Research has also been conducted on the *Effects* on, and/or the *efficiency* of certain applied teaching principles in Aural Training and other music disciplines. The studies by Denise Kath Gamble, and Christoph Hempel and Andreas Lehmann are examples of research included in this category.[63]

The above outline and list of studies compiled in Appendix A provide definite proof for the conclusion that Aural Training has gained in importance given the increasing amount of research conducted since 1980. Several teaching strategies and comparisons between them have been examined, and a great deal of research has also been conducted in the field of programmed Aural Training. There are, however, still several neglected areas that need to be explored. Aural Training with children is one of the most neglected research topics. Applications of music psychological principles to Aural Training and the culmination of these principles in Aural Analysis also need more attention.

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60 Hilda Bester, **Gehooropleiding in die Twintigste eeu met spesiale verwysing na Nuwe Musiek.** Unpublished Master's thesis, University of Stellenbosch 1983.
Elizabeth West Marvin, **A Generalized Theory of Musical Contour: Its Application to Melodic and Rhythmic Analysis of Non-Tonal Music and its Perceptual and Pedagogical Implications.** Doctoral dissertation, University of Rochester 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

61 Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 75-90.
Gary Potter, "Putting Skills to Work: An Aural Analysis Project" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 69-84.

62 Janet Claire Garton "The Efficacy of Computer-Based and Tape-Recorded Assistance in Second-Semester Freshman Ear Training Instruction" in **Dissertation Abstracts International**, 42/11 (May 1982) pp. 4756-A - 4757-A.

63 Denise Kath Gamble, "A Study of the Effects of Two Types of Tonal Pattern Instruction on the Audiation and Performance Skills of First-Year Clarinet Students" in **Dissertation Abstracts International,** 50/4 (October 1989) pp. 893-A - 894-A.
Christoph Hempel and Andreas Lehmann: **TELG - Testreihe zur Ermittlung von Lernfortschritten in der Gehörbildung.** Pre-publication copy of the authors' contribution to a panel discussion during the *KlangArt-KonGreß* held at the University of Osnabrück in 1991.

CHAPTER TWO

Theoretical overview of the didactics of Aural Training

INTRODUCTION

It is a well-known fact that whenever music is heard the opportunity to train the ear exists. To that extent Aural Training is a "collective" subject addressed either consciously or unconsciously in every music lesson. These two levels of auditive perception can be compared with Siegfried Palm's discrimination between "Hörer" (hearer), and "Horcher" (listener).[1]

Two forms of instruction can thus be distinguished. The first "spontaneous" form of Aural Training has to some extent always been included in musical training, because auditive abilities and the thinking processes linked to hearing form the core of all music instruction and listening. In this "unpremeditated" form no attention is consciously given to the development of aural abilities through special exercises. Walter Baer referred to this phenomenon as "incidental hearing"[2]. Hearing is circumstantially stimulated by the music environment, e.g. at the music lesson or through concert attendance.

The nature of the second form of formal, planned Aural Training embodied in distinctive aural instruction methods is reflected in the word "Horcher" (listener), which can also be translated as "eavesdropper". An eavesdropper secretly listens to a conversation, i.e. he is aurally "spying". A more alert phase of auditive perception that includes understanding and evaluation is suggested.[3]

Whereas the first form of Aural Training is as old as music itself, the second form has only existed for the last 150 years. Hubert Haas and Erhard Karkoschka described the different historical phases of Aural Training and referred to the fact that the demands made on the ear have become more and more differentiated.[4] According to them the levels of differentiation is a historical process manifesting itself in the written fixation of music by means of letters, names, tabulators, notes and numbers as well as other forms of sound representation, e.g. the Guidonian hand and tonic-doh.

The authors continued that the first real pedagogical endeavour to consciously train the ear was found in *Der Vollkommene Kapellmeister* (1735) by Johann Mattheson. Mattheson covered the areas of melodic dictation, improvisation and transpositional dictation in all clefs, keys and time signatures. By comparison, in earlier works by Sebastian

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1 Siegfried Palm, "Nachdenkliches beim Hören von Musik" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987 p. 61.

2 Walter Baer, "Systematische Hörschulung - wie und wozu?" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1977 pp. 11-14.

3 Alphons Silbermann, "Hören - Horchen - Verstehen" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987 p. 8.

4 Hubert Haas and Erhard Karkoscka, **neue musik hören - Eine Hörerziehung mit neuer Musik in Theorie und Praxis.** Rohrdorf: Rohrdorf, 1981 pp. 6-7.

Virdung (*Musica getuscht*, 1511), Michael Praetorius (*Syntagma musicum*, n.d., probably after 1613), as well as later pedagogical works by Carl Philipp Emanuel Bach (*Versuch über die wahre Art das Clavier zu spielen*, 1787), Johann Joachim Quantz (*Versuch einer Anweisung, die Flöte traversiere zu spielen*, 1752) and Leopold Mozart (*Versuch einer gründlichen Violin-Schule*, 1756), no suggestions were made concerning the conscious training of the ear.

It can, however, be argued that the use of the St. John hymn by Guido of Arezzo in the ninth and tenth centuries A.D. was the first pedagogical approach to sight singing. The technique to "solmisize" whole melodies was developed at the latest by the thirteenth century.[5] Though this is not clearly stated, Haas and Karkoschka seem to see the syllables used by Guido as a forerunner of pedagogical approaches to Aural Training. Although certain Aural Training methods were used earlier, the idea and terminology of a consciously developed aural education was born during the nineteenth century. Reasons for the initiation of conscious Aural Training can be found in the fact that the appreciation of music from this period demanded better schooling in listening as well as in the social changes of the nineteenth century. The liberation of the middle class, the call for enlightenment and humanitarianism as well as the availability of more free time resulted in a readiness and demand for general education.[6]

Pioneering work was done in 1810 by Michael Traugott Pfeiffer and Hans Georg Nägeli, based on ideas by Johann Heinrich Pestalozzi, Albert Lavignac, who started Aural Training instruction in 1871 at the Paris Conservatory of Music, and Hugo Riemann who wrote the *Katechismus des Musikdiktats* (1889). The following quotation from Pierre Galin is an example of the growing awareness of the necessity of Aural Training in the nineteenth century:

> "Il est singulier que l'on ait toujours commencé ce genre d'enseignement par parler aux yeux de l'élève, au lieu de parler plutôt à ses oreilles; il semble, en effet, qu'on devrait lui enseigner le langage oral de la musique avant de lui en enseigner le langage écrit. Par exemple, on ne s'avise pas d'apprendre à parler à un enfant par le moyen de la lecture, et de lui mettre un livre sous les yeux pour l'instruire à prononcer des paroles; c'est néanmoins ce que l'on fait ici: on fait chanter l'élève sur le livre, on le fait *lire* avant qui'il sache solfier en chantant ou qu'il sache *parler*."[7]

Although the origin of Aural Training has been discussed in the previous paragraphs, it is not the aim of this research endeavour to give a *detailed* history of Aural Training. The historical roots of a *few* methods are traced and shortly introduced later in this chapter. The **purpose** of Chapter Two is to present a complete picture of "intentional" Aural Training in the twentieth century, based on information found in published and unpublished literature as well as in

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5 Martin Ruhnke, "Solmisation" in **Die Musik in Geschichte und Gegenwart,** 12 p. 844.

6 This fact is also supported by Joseph Müller-Blattau. Aural Training as a subject/part of a subject started at the beginning of the Nineteenth Century when general music education became important to general public. Before that, Aural Training was incorporated to some extent in school and church education.
Joseph Müller-Blattau, "Gehörbildung" in **Die Musik in Geschichte und Gegenwart,** 4 p. 1533.

7 Pierre Galin, **Exposition d'une Nouvelle méthode.** Paris: Rey and Gravier, 1818.
"It seems strange that musical instruction has always been begun through the eye of the pupil, instead of through his ear. It is surely evident that we should teach the oral language of music before the written language. For instance, we should not recommend teaching a child to speak by means of reading, or place a book before him to show him how to pronounce words. Yet this is what is done in music teaching: the child is required to perform from written notes; he is made to *read* before he knows how to sol-fa, that is, before he can *speak*."
(English translation by Bernarr Rainbow: Pierre Galin, **Rationale for a New Way of Teaching Music.** Clarabricken, Ireland: Boethius Press, 1983 pp. 54 and 55.)

research conducted on the theme of Aural Training. This chapter should thus be viewed as a review of literature in order to establish a theoretical basis for the practical questionnaire-based outline of Aural Training presented in Chapter Three.

The main divisions of this chapter are:

1. The rationale behind the teaching of Aural Training
2. Teaching ideologies
3. The contents and target group of Aural Training
4. Methodological approaches.

1. THE RATIONALE BEHIND THE TEACHING OF AURAL TRAINING

Reasons for the teaching of Aural Training referring to the significance and the objectives of this subject are discussed under this heading. Although these two aspects are closely intertwined in the teaching situation, exercising direct control over each other, they are separated here for the purposes of discussion only. In section 1.1, on the significance of Aural Training, two different approaches explaining the importance of this subject are introduced, whereas a hierarchy of Aural Training objectives is presented in section 1.2.

Most of the material discussed in these sections was found in sources other than Aural Training literature. An examination of various Aural Training books revealed that the majority of the authors did not refer at all, or very vaguely, to the rationale behind this subject. Gary Karpinsky made the same observation when investigating three text books:

> "Curiously, the authors never discuss the purposes of ear-training study. At best, they tell the student of the difficulties he may encounter and then describe the manner in which *Musicianship* will present the subject."[8]

Several books only consist of an acknowledgement section and exercises.[9] Prefaces and introductions mainly concentrate on "how to use this book", often with vague references to the importance and/or goals.[10] Bernhard Sekles, for example, wrote in 1901 that the aim of Aural Training classes is to develop the ear, rhythmical feeling and musical memory.[11] About eight decades later Heinz-Christian Schaper summarised a similar point no less vaguely in his *Gehörbildung compact*, saying that his book is a compilation of ideas and materials for a systematically developed general education, with the aim of broadening and deepening the connection of rudimentary principles with musical

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8 Gary S. Karpinsky, "Ear Training and Integrated Aural Skills: Three Recent Texts" in **Journal of Music Theory Pedagogy**, 3/1 (Spring 1989) p. 133.

9 E.g. Marie Egmond, **600 Dictees**. Amsterdam: Broekmans and Van Poppel, [n.d.].

10 This is especially true of books on programmed aural instruction (workbook with cassettes). The following two courses are only a sample of this phenomenon:
Robert W.Sherman and Morris Knight, **Student Workbook for Aural Comprehension in Music, Vols. 1 and 2.** New York: McGraw-Hill, 1972.
Wolfgang Breuer, **Gehörbildung - Für Unterricht und Selbststudium.** Stuttgart: J.B. Metzler, 1991.

11 Bernhard Sekles, **Musikdiktat - Übungsstoff in dreissig Abschnitten.** Mainz: Schott, 1901 p. 1.

experiences.[12] Just as dubious is Leo Horacek and Gerald Lefkoff's "improvement of hearing and notational skills".[13]

Some authors provided the student with aims such as: "To recall *exactly* the rhythm of a musical phrase, and to be able to convey it in writing, using conventional musical symbols."[14] The reason for mastering this activity, however, is not mentioned. Maurice Lieberman maintained that the student's progress depends on skilful guidance, encouragement and a reasonably good book. Although he tried to approach the parameters of music by explaining their characteristics, he did not provide the student with information on the significance and goals of Aural Training.[15]

Apart from the fact that references made to the objectives of Aural Training are often vague, these also tend to zoom in on only one or two aspects of the objectives.

It is then not surprising that Richard DeLone complained in the introductory section of his book that many students and instructors of sight singing "are unclear about the need for and the goals of sight singing courses." As a result of this, "a valuable tool for developing aural acuity is often misused or overlooked entirely."[16] This fact was "accidently" proven at the New England Conservatory in the United States of America. A range of test items used to evaluate a group of freshman sight singing students was unintentionally used to evaluate their achievement two years later. A comparison of the test results revealed that students failed to show significant improvement in sight singing skills.[17]

Two possible conclusions can be drawn from these observations. Firstly, it could be that the importance and objectives of Aural Training are so commonly known that the authors did not comment on them. Secondly, a more likely conclusion could be that the rationale of Aural Training has not been thoroughly thought through by most authors and teachers in this field. It seems as if quite a number of authors in their realization of the need for instruction material take time to organise for example dictation exercises according to different levels of difficulty, without giving thought to the philosophy behind this activity. This situation was summarised by Paul Loeb van Zuilenburg who stated that tradition and habit seem to dictate many Aural Training methods, some of which might be inefficient, superfluous or inadequate.[18]

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12 Heinz-Christian Schaper, **Gehörbildung compact - Teil I: Grundlagen und Übungen.** Mainz: Schott, 1989 p. 5.

13 Leo Horacek and Gerald Lefkoff, **Programmed Ear Training Vols. 1 - 4.** New York: Harcourt, Brace and World, 1970.

14 Michael Illman, **Systematic Aural Training - Teacher's book.** London: Longman, 1974 p. 5.

15 Maurice Lieberman, **Ear Training and Sight Singing.** New York: W.W. Norton, 1959.

16 Richard R. DeLone, **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981 p. 1.

17 Lyle Davidson and Larry Scripp, "Part One: A Developmental View of Sightsinging" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) p. 10.

18 Paul Loeb van Zuilenburg, "Aspects of Aural Training" in **Music in Education**, 39/371 (1975) p. 23.

1.1 The significance of Aural Training

The most common approach to define the importance of Aural Training embodies the examination of its influence on other subjects as a way of determining its efficiency. In several research projects it has been pointed out that Aural Training has had a positive effect on students' achievements in other subjects.

In a study where the effect of sight singing on sight reading was investigated, John Michael Bozone found that sight singing was a valuable aid in the improvement of piano sight reading skills.[19] Michael Paul Dunlap investigated "whether beginning elementary instrumental students who engaged in singing and solmization as part of their instrumental class activities developed greater aural, performance and music reading skills than instrumental students who did not receive this training." He concluded that vocal accuracy was significantly related to melodic ear-to-hand coordination, melodic aural visual discrimination, instrumental performance skills and musical aptitude.[20] Denise Kath Gamble found that, when compared to students who did not receive "tonal pattern instruction", beginner clarinet students who learned sequential skills based upon a music learning theory with a content of arpeggio patterns achieved superior skills in tonal audiation and performance of notated music.[21] Tonal pattern instruction included listening, singing, recognizing, playing and reading patterns in major and minor tonalities.[22] William H. Trusheim interviewed twenty-five top orchestral brass players on topics such as Training and Experience, Mentors, Warm-up, Mental Rehearsal, etc. He discovered that aural or auditory imagery was a prime ingredient for the great majority of subjects.[23]

Although not statistically, Rochelle Mann witnessed the influence of aural development on other music subjects. According to her, during Music History classes students were able to sing examples of early music of which no recordings were available. More accurate instrumental readers with better intonation could be found in her music department because of the Kodály method used there.[24] Theo Hug referred to the fact that a string instrument player has only his ears to check his intonation, and that it is therefore important to start with Aural Training as soon as

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19 John Michael Bozone, "The Use of Sight Singing as a Prestudy Aid for the Improvement of the Sight-Reading Skills of Second-Semester Class Piano Students" in **Dissertation Abstracts International**, 47/7 (January 1987) p. 2358-A.

20 Michael Paul Dunlap, "The Effects of Singing and Solmization Training on the Musical Achievement of Beginning Fifth-Grade Instrumental Students" in **Dissertation Abstracts International**, 51/2 (August 1990) pp. 444-A - 445-A.

21 The neologism audiation was created by Edwin Gordon. Audiation takes place when one hears and comprehends music silently, that is, when the sound is not physically present.
Edwin E. Gordon, **Learning Sequences in Music - Skill, Content, and Patterns.** Chicago: G.I.A., 1988 p. 7.

22 Denise Kath Gamble, "A Study of the Effects of Two Types of Tonal Pattern Instruction on the Audiational and Performance Skills of First-Year Clarinet Students" in **Dissertation Abstracts International**, 50/4 (October 1989) p. 894-A.

23 William H. Trusheim, "Mental Imagery and Musical Performance: An Inquiry into Imagery Use by Eminent Orchestral Brass Players in the United States" in **Dissertation Abstracts International**, 49/4 (October) 1988 p. 655-A.

24 Rochelle Mann, "Why should Elementary Students have All the Fun?" in **Music Educators Journal**, 76 (September 1989) p. 42.

possible.[25] Both Hug and Helmut Zehetmair pointed out that Aural Training is a requirement and supplement for instrumental teaching.[26] For Samuel Adler, Aural Training is the way to musical literacy in that it prepares the student for the conditions that exist in the profession.[27] Brian Hodel interviewed a number of performers, composers, instrumental instructors and Aural Training teachers on the "usefulness" of Aural Training. Some of their responses were:

> "'It is important for general musicianship, just as courses in drawing are important to the painter or sculptor' (Heskel Brisman, composer and music editor). 'It is nonsensical to even think of separating ear training from mastery of the instrument' (Eliot Fisk, concert guitarist). 'The knowledge of phrasing gained through ear training makes the difference between a robot and a good interpreter' (Dr. Ermelinda A. P. de Souza Barros, professor of musical perception, University of Rio de Janeiro). Let me add to these rather pointed endorsements a more analytical one by Ralph Kirkpatrick: 'For me the working out of a musical interpretation or the solving of a technical problem is inseparable from the necessary long-life process of training the ear. No ear is so dull that it cannot be trained; no ear is so sensitive that it cannot be taught or teach itself to hear more; no emotional capacities or sensory perceptions are so complete that they cannot be further developed.'"[28]

Finally, a few quotations of students' opinions on the worth of Aural Training:

> "'During my winter vacation I got together with my high school teacher and he immediately noticed that my rhythm is much better. He wanted to know *what* they were teaching me at the conservatory. I told him I thought that my solfege course was really helping me with intonation and rhythm on my instrument' - a first- year solfege student (performing major).
>
> '... I began to see what my hand could show. It wasn't simply repeating a pattern meaningless[ly] but it was [expressing] something. A firm downbeat, a rebound that was internalized, a lightness, a heaviness showing my hand ...I found new ways to cope with problems with ensemble in chamber music' - a second-year solfege student (performance major).
>
> 'Through sightsinging I have learned to hear music with my inner ear - I can now write music without having to play it on the piano' - a second-year student (composition major)."[29]

A more comprehensive approach explaining the need for Aural Training, however, not only tries to see its relevance in its application to other subjects, but concentrates on the mental development of the musician. Development in cognitive musical thinking will inevitably influence achievement in other subjects. According to this approach, the intrinsic value of Aural Training lies in the fact that it forms the source of all music education. Gisela Distler-Brendel is only one of several German educators who sees Aural Training as the central goal of Music

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25 Theo Hug, "Unser Gehör und Intonationsprobleme des Streichers" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 90.

26 Helmut Zehetmair, "Spezielle Aufgaben einer Gehörbildung im Violinunterricht" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 91.

27 Samuel Adler, **Sight Singing.** New York: W.W. Norton, 1979.

28 Brian Hodel, "Ear Training for Guitarists" in **Guitar Review**, 68 (Winter 1987) p. 3.

29 Larry Scripp and Lyle Davidson, "Part Two: Framing the Dimensions of Sightsinging: Teaching toward Musical Development" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) p. 25.

Education, because it enables the student to perceive and think in the characteristic categories of music.[30] Arpad Darazs and Jay Stephen described the value of Aural Training as follows:

> "By awakening the ear and using it as the central tool for teaching and experiencing music we can prepare the way for instrumental training as well as for intelligent and more enjoyable music listening."[31]

Aural Training can provide the student with the means to become a musically literate person who comprehends musical building blocks and structures. According to Roland Mackamul, the student can learn to develop his concentration abilities and musical memory. He can develop the ability to unify (a) mental representations of sound, (b) the score and (c) instrumental grip "simulations" in a unity called inner hearing. Aural Training gives the student the ability to aurally understand musical relationships and their building blocks in such a way that he can reproduce what was heard on an instrument, and it enables the student to combine a pure emotional experience with subject-related criteria.[32]

Hermann Sprenger also stressed the fact that all education involves the development of thinking processes. According to him, Aural Training serves to develop concentration abilities. It trains the ability to consciously penetrate musical processes and to be sensitive to the qualitative effect, thus implying the development of affective abilities. He warned against the danger of the perpetual *testing* of aural abilities as opposed to the *development* of these. The goal of Aural Training should not simply be the recognition of musical elements, but the experience of these in a qualitative way of learning. Sprenger pointed out that Aural Training is not *only* a subject for specialists that should *also* have its place in the music curriculum. Rather, it is a basic and overlapping subject that could fertilise all musical activities.[33]

1.2 The objectives of Aural Training

> "Everyone can hear melodies and enjoy them. But the musician must know what he is hearing."[34]

In this quotation of Leo Kraft, the core of what Music Education and Aural Training desires to achieve, is addressed. "Indepth understanding", "Verstehendes Hören" (comprehensive hearing), "das bewußte gedankliche Durchdringen des Gehörten" (the conscious mental penetration of what was heard), "insight into, and total comprehension of

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30 Gisela Distler-Brendel "Befähigung zum musikalischen Hören als zentrales Lernziel des Musikunterrichts" in Bernhard Dopheide (Ed.), **Hörerziehung**. Darmstadt: Wissenschaftliche Buchgesellschaft, 1977 p. 225.
Another example of an author with the same outlook:
Heinz Kratochwil, "Hörerziehung in der Ausbildung zum Musikpädagogen" Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 19.

31 Arpad Darazs and Jay Stephen, **Sight and Sound - Visual aid to melody and harmony.** Oceanside, New York: Boosey and Hawkes, 1965 p. 5.

32 Roland Mackamul, **Lehrbuch der Gehörbildung, Band I.** Kassel: Bärenreiter, 1969 p. 8.

33 Hermann Sprenger, **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.] pp. 3-4.

34 Leo Kraft, **A New Approach to Ear Training - A Programed Course to Melodic Dictation.** New York: W.W. Norton, 1967 p. 3.

music" are all expressions that appear in the majority of books on Aural Training and Music Education.[35] The meaning of these expressions was summarised by Charles Leonhard and Robert House, who presented a definition of what they called "musical understanding":

> "Musical understanding is defined as the ability to bring accumulated musical learning to bear on the solution of musical problems. It involves the conscious use of information, skills, appreciation, and musical concepts in a cognitive framework when one is involved in such musical endeavors as listening, performing, composition, improvisation, and music reading. The principal ingredient of musical understanding is the ability to apply consciously one's knowledge of and sensitivity to embodied musical meaning, musical structure, and musical style to all types of musical experience. It seems evident that the development of musical understanding, along with the development of musical appreciation, represents a major cornerstone of any serious program of music education.
>
> Musical understanding should not be considered as unique to higher levels of musical accomplishment. It can and indeed should come into play at every level of music education."[36]

Three main aspects of comprehension were addressed by Leonhard and House, namely problem-solving, the conscious use of information, skills ,etc. and the application of knowledge. According to them, these aspects should be incorporated into all levels of music education. This implies that there is more than one level of understanding, a fact that was confirmed by Gisela Distler-Brendel who defined four "cumulative" levels of conscious listening:

(a) Perception of sensorial impulses such as different pitches, duration, timbre, texture, etc.
(b) "Physiognomical", emotional-associative listening.
(c) Structural listening, hearing of musical forms in which both anticipational and reflective listening are incorporated.
(d) Evaluative listening in which all the previous aspects of listening culminate.[37]

The presence of different levels of comprehensive listening implies that there is, or should be, a hierarchy of objectives. A complete hierarchical structure of objectives primarily designed for Aural Training purposes could, however, not be located. An attempt is therefore made in this research endeavour to organise the objectives of Aural Training in such a hierarchy, starting with the perception of simple sensorial impulses and ending with the "ideal" listener.

In the following discussions emphasis is placed on the long-term goals of Aural Training, because these goals are often vaguely described in Aural Training literature, or are non-existent. On the contrary, short-term goals and aims such as "to be able to sing, dictate, clap, etc. the heard musical phrase" appear abundantly in all Aural Training work books. In section 1.2.1 the pre-eminent rudimentary long-term goal of Aural Training is described, followed by

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35 The following three books are just a very small sample of the vast majority of books and articles which refer to this general goal:
Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern Universtity, Evanston, Illinois 1980. University Microfilms International, 1980 p. 63.
Paul Loeb van Zuilenburg, **Gehoortoetse en Gehooropleiding - 'n Inleiding.** Stellenbosch: Cabo, [n.d.] p. 1.
Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen's Verlag, 1983 p. 5.

36 Charles Leonhard and Robert W. House, **Foundations and Principles of Music Education.** New York: McGraw-Hill, 1972 pp. 133-134.

37 Gisela Distler-Brendel "Befähigung zum musikalischen Hören als zentrales Lernziel des Musikunterrichts" in Bernhard Dopheide (Ed.), **Hörerziehung**. Darmstadt; Wissenschaftliche Buchgesellschaft, 1977 p. 229.

sections 1.2.2 and 1.2.3 (the primary and secondary long-term goals of Aural Training), with a fourth closing section 1.2.4 covering the hierarchy of these long-term goals.

1.2.1 The pre-eminent rudimentary long-term goal

All the objectives of Aural Training are built on the simplest form of auditive perception of sensorial impulses reflecting itself in terms such as high/low, long/short, soft/loud, slow/fast. Helmut Rösing added to this that the day-by-day perception of the general acoustical environment should be sharpened.[38]

If students fail to discriminate between the general characteristics of sound, it is impossible for them to differentiate on a more detailed level in subject-related terminology. Exact pinpointing of pitches in letter names and/or solfa, or duration in note values such as half notes and whole notes is impossible. *The achievement of this rudimentary goal of sensorial perception provides the basic requirement for the process of becoming a knowledgeable listener.*

Although this goal is the prerequisite of Aural Training, it is a goal that has its place in all levels of Aural Training. Even on a tertiary level the achievement of this goal can be used as a pre-stage to problem-solving in complex musical situations. Hubert Haas, who taught Aural Training at a tertiary level, provided the following example: when a student has to reproduce a row of six or seven tones by singing, it often happens that the student stops when he makes a mistake. The discrepancy between the sound that he reproduces and the sound image in his memory is reflected in the sensation that something is wrong. If he really could not remember it, there would have been no discrepancy. This problem can be solved by starting to ask the most rudimentary question of all: was the tone reproduced wrongly too high or too low?[39]

1.2.2 The primary long-term goal

In the determination of the end goal of Aural Training the point of departure in this discussion will be the "ideal listener". Striving to become an ideal listener is in most cases utopian. There is, however, evidence of individuals with superior auditive abilities such as the "photographic ear". Karl Macek, for example, taught a young man of about fifteen or sixteen years of age the piano for a short period. During that time they concentrated on basic theory and keyboard harmony in order to enhance his aural skills. Two years later this former pupil, called Eric, contacted Macek again and played for him. His playing then was described as "amazing", as a "minor musical miracle."

The crux of the matter is that Eric had developed certain skills over a period of years. Although he must have had a superior musical talent, his skills had to be developed through instruction and practice. Excerpts from a letter written to Macek describes Eric's auditive abilities:

> "I have a sort of 'photographic ear'. I not only hear sounds, but I can *visualize* them. ... I *know* every single note on every one of my Tatum records. It is there in the finest detail as though on a photograph. I can point with a mental pointer to any note, look at it in still motion and examine it. It's like having a movie projector where you can stop the film and study the scene to your heart's content before moving on.

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38 Helmut Rösing, "Gedanken zum 'musikalischen Hören'" in **Die Musikforschung,** 27/2 (1974) p. 216.

39 Hubert Haas, **Unterrichtsmethoden im Lernbereich Musikhören.** Unpublished article, [n.d.] p. 3.

... In my mind I don't run through the film from the beginning to get to a particular scene. I yank the music right out of my mental files and start at the beginning of the place I want to start ... The records in my collection are so imprinted and photographed in my mind that I don't really need a record player to hear them. If I want, I can hear them in complete detail from start to finish. ... Now, when I hear a new recording, I see the notes as well as hear them. I can feel myself playing and somehow, my mind works fast enough so that I can watch my fingers playing as I listen to the record."[40]

Eric's explanation of his photographic ear can be compared with Adorno's expert listener, representing according to him, the highest level of listening. This type of listener consciously understands everything that he hears. When confronted with, for example, the second movement of Webern's String Trio Op. 20 for the first time, he is able to recognise and name the different formal sections. While listening to complex music he is able to hear the succession of events (the past, present and future impressions) in such a way that a sense of cohesion crystallises out of this spontaneous hearing. Complex harmonies and polyphony are also consciously perceived. Adorno suggested that this "fully adequate" musical behaviour could also be called structural listening.[41]

Gustav Güldenstein's ideal musician hears a complex not-too-long work for various instruments several times. He is afterwards capable of mentally imagining the work with all its details in such a way that strongly matches a hallucination. This "image" is finally precisely analysed in order to be able to write down the score of what was heard without mistakes. The ideal musician is also able to read an unknown score and hear the complete performance mentally with respect to all characteristics such as relative and absolute pitch, rhythm, dynamics, agogics, articulation, phrasing and timbre.[42]

The ideal listener of Erwin Ratz likewise perceives every musical detail consciously and takes nothing for granted. Reasons for certain appearances are sought in order to develop beyond the instinctive recognition level. The relationship between detail and the whole is understood.[43]

Güldenstein, however, claimed that Aural Training will never be able to meet the above requirements. Although the reearcher agrees with this statement, a few auditive characteristics that a mediocre musician should strive to develop can, however, be derived from the above descriptions. The ***primary long-term goal*** of Aural Training thus should be to develop the following auditive characteristics:

The average musician will not only be able to function on a structural listening level (recognizing broad, overview, formal characteristics of a musical work), but will also be able to function on a perceptual listening level (recognizing details such as building blocks). He will have the ability of "two-way" mental imagination (sound to

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40 Karl Macek, "The Photographic Ear" in **The Piano Quarterly**, 35/137 (1987) pp. 46-48.

41 Theodor W. Adorno, **Einleitung in die Musiksoziologie.** Frankfurt/Main: Suhrkamp, 1968 pp. 15-16.

42 Gustav Güldenstein, **Gehörbildung für Musiker: Ein Lehrbuch**. Basel: Schwabe, 1971 p. 13.

43 Erwin Ratz, **Einführung in die musikalische Formenlehre.** Vienna, Universal Edition, 1973 p. 8.

symbol, symbol to sound), and will be able to act passively and actively on what was heard.[44] *The three aspects of musical understanding (problem-solving, conscious use of musical concepts and application) mentioned earlier, are thus included in the long-term goal of Aural Training. Having achieved this goal, the conductor will be able to link his score to an inner mental representation. The singer will be able to learn his part without hammering it out on the piano, and the instrumentalist will be able to present more than pure technical playing. It is not the goal of Aural Training to enable students to fully perceive a work at first sight or hearing. Such an approach would be unrealistic. Aural Training can, however, educate musicians to learn and reproduce the musical works that they are studying in a conscious way. What is meant is not only the ability to connect individual tones with mental pitch and rhythm representation, but also the recognition of thematic and harmonic details and relationships. It also implies the ability to connect sound images with their definitions.*[45] *Friedmann's good listener "goes beyond the mechanics of accurate dictation or precisely pitched singing; it enables the listener to perform acts of at least rudimentary analysis without consulting the score."*[46]

In accordance with the earlier mentioned different levels of understanding, different levels of the achievement of this long-term goal can be distinguished, with the highest level that of the ideal listener. Factors that have an influence on the different levels of achievement are:

- Duration of the material that was heard
- Number of hearings
- Familiarity with the musical syntax (style period).

The longer the heard musical examples are, the less the number of hearings necessary to complete the task at hand, and the more complex the musical syntax is, the higher the level of achievement is.

1.2.3 The secondary long-term goals

With the two "pole" objectives of Aural Training established (to perceive simple sound impulses and to develop structural evaluative listening), the question arises as to how a student can develop from one pole to the other. In order to answer this question, secondary goals should be added between the two poles in order to create a continuum of goals based on the foundation of the listening process which takes place in the mental realm.

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44 The terms passive and active were used by Paul Loeb van Zuilenburg to describe listening tasks (e.g. dictation, error detection) and performance tasks (e.g. sight singing, instrumental reproduction, improvisation, composition).
Paul Loeb van Zuilenburg, "Aural Training and its Relation to the Teaching of Harmony and Counterpoint" in **Ars Nova**, 7/1 (1975) pp. 19-20.

45 Roland Mackamul, "Gehörbildung - wo und wann? (I)" in **Schweizerische Musikzeitung**, 123/2 (March/April 1983) p. 98.

46 Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990 p. xxiii.

Aural Training, which is based on hearing and listening, is a communication between musical structures and the development of the skill to recognise and understand these sound structures.[47] Robert Olson described this mental exercise as a co-ordination of the ear and the mind on a musical subject.[48] This perspective of Aural Training has also been addressed by Steward MacPherson and Ernest Read, as well as by C. Foster Browne.[49]

Furthermore, it is clear from the Leonhard and House definition of musical understanding that comprehension is a mental activity. Because of this mental aspect of Aural Training, it is relevant to study the listening process briefly. It is only when the different variables of the listening process are known that secondary goals to develop the ear can be set up.

Warren F. Prince compiled a paradigm in which he listed all possible variables of the listening process. Prince attempted to draw a complete hypothetical picture of this process referring to aural perception processes, aural habits, and early environmental influences in such a way that the relationship between the variables could be seen. In the paradigm three general variable types appear, namely (a) the characteristics of listening, (b) affective and associative perception, and (c) perception and learning processes. These can be clearly seen: all the variables that deal directly with the hearer (e.g. personality, musical ability) are concentrated at the top. These variables are connected to the general attentiveness of the hearer which influences and intensifies his perception. Perception patterns appear in the middle of the paradigm. A group of learning process variables, which in turn influences the perception variables, emerges at the end of the paradigm. An arrow in one direction indicates that this variable has an influence on other variables in the listening process but cannot be influenced by this/these variable(s). The connection of variables with arrows in both directions indicates that these variables have a mutual influence on each other.[50]

The complexity of the listening process can clearly be seen in the paradigm. According to Prince, one facet of this intricacy is that change in one variable evokes change in other variables. A person with a "short" musical memory will not be able to recognise for instance the formal characteristics of a piece of music. Memory is, however, influenced by analytical abilities in order to perceive musical structures. An improved ability to extract smaller musical entities (e.g. major chords, ostinato figures) will lead to an improved memory, which will again lead to a

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47 Walter Kolneder, "Visuelle und auditive Analyse" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962 p. 57.

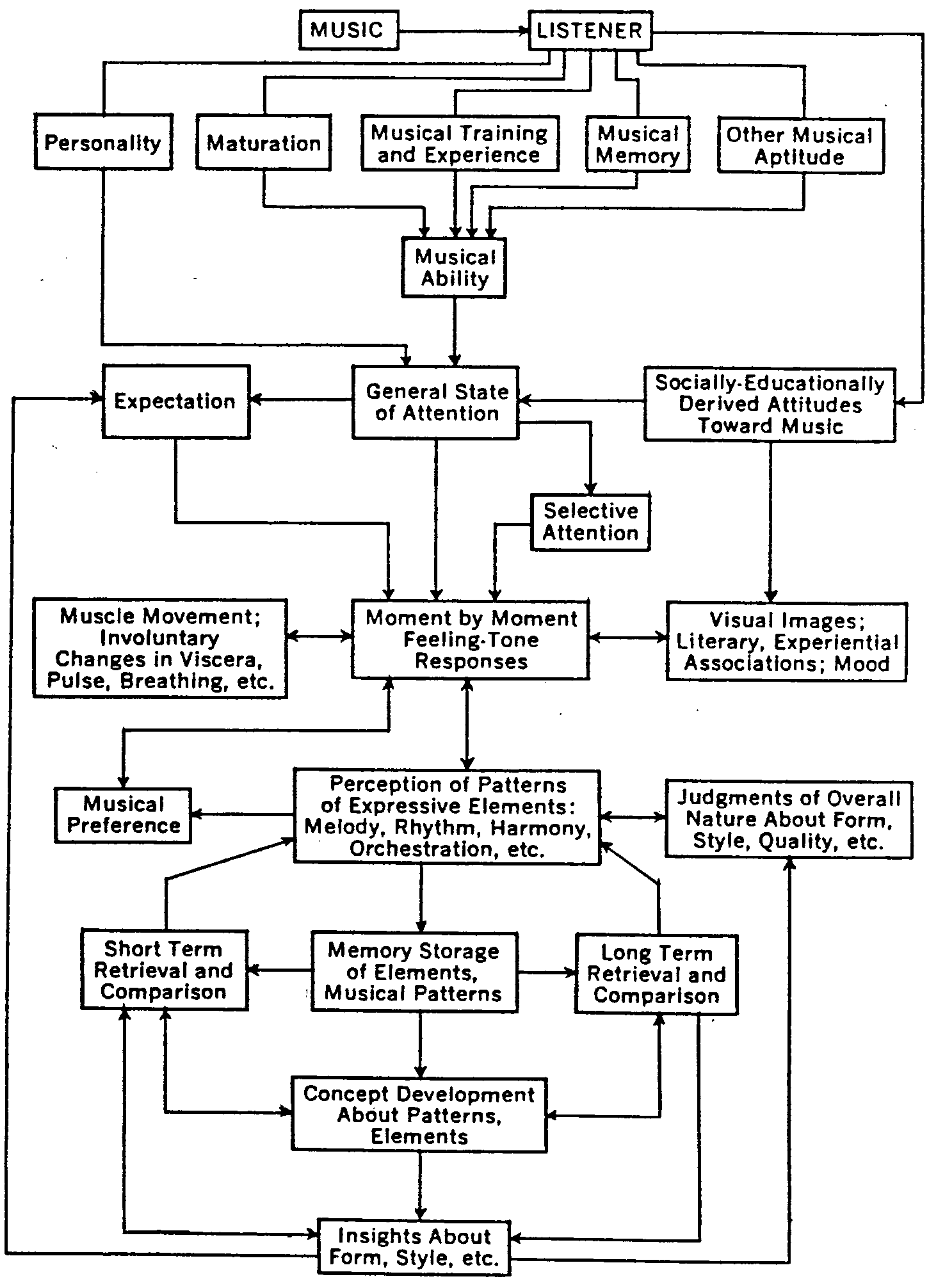
48 Robert G. Olson, **Music Dictation: A Stereo-Taped Series.** Belmont, California: Wadsworth, 1970 p. 2.

49 Stewart MacPherson and Ernest Read, **Aural Culture based upon Musical Appreciation, Part I.** London: Joseph Williams, 1953 p. 1.
C. Foster Browne, **The Sight and Sound of Music - A New and Easy Method of Learning to Read Music.** London: The Cresset Press, 1969, p. 3.

50 Warren F. Prince "A Paradigm for Research on Music Listening" in **Journal of Research in Music Education,** 19 (1971) pp. 445-455.

better perception of formal aspects.[51] This will have an effect on the attentiveness of the student, which again will have an influence on other variables.

Fig. 2.1 Prince: Paradigm for research on music listening



51 Werner Pütz indicated that structural listening implies a good concentration ability, a rapid processing of the received information and a good memory. These abilities can be practised through "partial" listening (parameter listening) and detail listening. Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung**, 63/5 (May 1972) pp. 233-234.
Prof. Hubert Haas explained in an interview with the researcher on the 5th of October 1988 that the process of chunking can expand the known seven plus-minus one units normally stored in the short-term memory. If units (e.g. pitches) can be organised into structures such as chords, and can be labelled with terms such as repetition and sequence, more information can be stored in the short-term memory. According to him, listening is the ability to describe what was heard in theoretical terminology.

Changes in the variables of the listening process imply changes in musical behaviour, i.e. aural behaviour. This is mainly possible through learning and instruction. Against the background of the listening process, certain goals can be determined in order to improve or develop the musical ear. Goals that can be derived from Prince's paradigm are:

- To develop attentiveness
- To develop concentration
- To develop musical memory
- To develop the ability to associate sound with non-musical ideas
- To develop the ability to perceive musical structures in a microscopic way (perception of building blocks)
- To develop the ability to perceive musical structures in a macroscopic way (perception of formal characteristics)
- To develop the ability to evaluate aural impressions (e.g. interpretative comparisons, self-critique).

Wilhelm Lehr also followed this procedure of investigating the listening process in order to derive aural objectives from it. He referred to the work of Raoul Husson in which the spinal cord, mid-brain and cortex respectively are responsible for automatic dymogenetical reflex movements, affective nuances and associative intellectual images. Listening does not only take place in the peripheral sphere of the sense organs, but also in the emotional and intellectual spheres. Lehr concluded that Aural Training should take place on the sensorial, affective and cognitive levels. He derived the following goals from the above information:

- To broaden the natural hearing abilities and adjustment of perception deficiencies
- To assimilate and transmit sound events accurately
- To develop the ability to store auditive impressions and accurate replies/responses/reproductions
- To develop the ability to evaluate perceptions and to solve specific aural assignments through analysis and synthesis of complexes
- To apply what was heard in a form of "creative" education
- Rapid perception and ordering of parameters.[52]

There is a remarkable similarity between the goals that can be derived from Prince's paradigm and the goals formulated by Lehr. A summary of these, an application of Bloom's taxonomy of educational objectives to Aural Training, as well as goals found in other sources, present the ***secondary long-term goals*** of Aural Training.[53] These goals aim to develop:

(a) *Cognitive listening:* *(i) Microscopic structural listening (analysis, building blocks, clichés)*
(ii) Macroscopic structural listening (perception of overview, synthesis)
(iii) Musical memory (assimilation, association)
(iv) Inner hearing
(v) Creation
(vi) Evaluation

(b) *Affective listening (attentiveness, willingness, concentration)*

(c) *Psychomotor skills (practice-based skills to support other subjects)*

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52 Wilhelm Lehr, "Gehörbildung, Gehörtraining, Hörerziehung" in **Neue Musikzeitung**, 34/5 (October/November 1986) p. 26.

53 Bloom et al. determined three covert variables of learner's behaviour: the cognitive, psychomotor and affective. Richard Colwell and Thomas Regelski applied these principles to music education.
Krathwohl, Bloom and Masia, **Taxonomy of Educational Objectives - The Classification of Education Goals, Handbooks I and II.** New York: David McKay, 1956 and 1964.
Richard Colwell, **The Evaluation of Music Teaching and Learning**. Englewood Cliffs, New Jersey: Prentice-Hall, 1970 pp. 79-131.
Thomas A. Regelski, **Principles and Problems of Music Education**. Englewood Cliffs, New Jersey: Prentice-Hall, 1975 pp. 206-225.

(a) Cognitive listening

The domain of cognitive listening embodies all activities based on mental processes such as:

knowing (of e.g. specifics, terminology, facts, trends and sequences, classifications and categories, methodology theories and structures)
comprehension (translation, interpretation, extrapolation)
application (application of known principles by, for example, demonstrating the correct use of a method)
analysis (of elements, relationships and organizational principles)
synthesis (production of a unique communication, e.g. improvisation, production of a plan or proposed set of operations, derivation of a set of abstract relations, creation)
evaluation (judgments in terms of internal evidence and external criteria)[54]

An application of these cognitive principles to Aural Training appear in the following goals. It is important to note that Bloom's taxonomy is only generally applied to the teaching of Aural Training. A detailed level-for-level correlation between the researcher's goals and the taxonomy is not presented. Listening is, according to Peter R. Webster and Keith Swanwick, also a creative task, in that heard elements are grouped together in order to create an understanding of what was heard.[55] The researcher expanded Bloom's definition of synthesis by determining *two* levels of creation (synthesis). The first level is that of creating entities when listening to music, thus creating a personal, formal understanding of what was heard. This level complies with macroscopical structural listening. In the second synthesis level, personal ideas in the form of original improvisation, composition, and/or written/mental theoretical formal analysis, form the core. This level is discussed under the *creation* heading.

(i) Microscopic structural listening

The first phase of this goal strives to identify and understand *all* the elements of music as well as ways in which they can interact with one another. Gaining theoretical knowledge of, for example, different kinds of rhythms, basic types of pitch organization (modal, tonal, atonal, etc.), timbre, range and density is important in this phase.[56]

During the second phase, auditive perception of building blocks such as intervals, scales, chords, stereotype rhythms, cadences, ostinato figures, epoch or composer-related orchestration characteristics should be developed. Loeb van Zuilenburg referred to this phase as the familiarization of clichés and Murray Gould called it the perceptual level of thinking.[57] Janet McLoud McGaughey provided a reason for achieving this goal:

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54 Hannah as adapted by J. Cawood, F.B. Muller and J.F.A. Swartz, **Grondbeginsels van die didaktiek.** Goodwood: National Educational Press, 1982.

55 Peter R. Webster, "Conceptual Bases for Creative Thinking in Music" in J. Craig Peery, Irene Weiss and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 p. 162.
Keith Swanwick, **Music, Mind, and Education**. London: Routledge, 1988 pp. 82-83.

56 George Pratt and Michael Henson, "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) p. 119-123.

57 Paul Loeb van Zuilenburg, **Gehoortoetse en Gehooropleiding - 'n Inleiding.** Stellenbosch: Cabo, [n.d.] p. 3.
Murray J. Gould, **Paths to Musical Thought.** New York: Holt, Rinehart and Winston, 1979 p. 1.

"The aim with basic drills is to provide a vocabulary of response patterns which the student will come to use automatically in reacting to what he hears."[58]

(ii) Macroscopic structural listening

This goal implies the development of the auditive perception of bigger formal constructions, motivic-thematic relationships, and polyphonic structures.[59] The principles of "grouping", in which formal characteristics such as recognition of the different themes, modulations and sections of, for example, the Sonata form should be aurally recognised, are incorporated in this goal. It forms the counterpart of the microscopic structural listening goal with the emphasis put on synthesis.[60]

(iii) Musical memory (assimilation, association)

The abilities of assimilation, association, and short-term and long-term storage of musical information should be developed. Volker Hoffmann pointed out that Aural Training does not provide training in the ability to hear, but rather training in the ability to contemplate a musical process that has already been stored. According to him, Aural Training is a way of memory training in which information saved earlier should be recalled.[61]

(iv) Inner hearing

The development of inner hearing is a special form of musical memory which is sometimes referred to as the "hearing eye" and the "seeing ear', as "a sixth sense of auditory-visual kindredship."[62] It points to "the ability to scan a line or score and hear it with the mind's ear *without* actually sounding the music, and ... the ability to render vocally at sight music of a wide variety of styles, genres and levels of difficulty, producing a good approximation of the pace, rhythm, melody, structure, and style of a given passage."[63] Inner hearing thus implies the translation of printed music into vocal/instrumental sounds which can be performed out loud by singing, or 'heard' by the inner ear.[64] Edwin Gordon labelled inner hearing with the term "audiation", determining seven types and six stages of this goal to

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58 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 p. 2.

59 Heinz Kratochwil, "Hörerziehung in der Ausbildung von Musikpädagogen" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1977 pp. 19-22.

60 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern Universtity, Evanston, Illinois 1980. University Microfilms International, 1980 p. 99.

61 Volker Hoffmann, "Hörerziehung oder auditive Wahrnemungserziehung" in **Musik und Bildung**, 7/6 (1976) p. 307.

62 Bruce Benward, **Sightsinging Complete.** Dubuque, Iowa: Wm.C. Brown, 1973 p. vii.

63 Richard P. DeLone, **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981 p. 1. (Italics by DeLone.)

64 David Thom Mason, "The Case for Moveable 'Do'. Solfege as a Practical Tool for Improvisors" in **Proceedings of NAJE Research**, 7 (1987) p. 95.

be reached.[65]

(v) Creation

According to Loeb van Zuilenburg a very high level of cognitive aural development is reached when a person is able to consciously create (compose, improvise) a musical work. The goal to create incorporates the utilization of all the cognitive activities described earlier. It thus is one of the goals of Aural Training to develop creative engagement with music.[66]

(vi) Evaluation

It is an important goal of education that students learn how to draw relevant conclusions and make relevant judgments about their own performance/composition/analysis and of those of others. The student should learn to take all factors related to a judgment into consideration instead of basing his evaluation on subjective and egocentric factors.[67] George Pratt and Michael Henson defined a few short-term goals regarding evaluation:

- To explain the role of criticism and how it can be applied
- To identify factors which affect critical judgement
- To examine the problems peculiar to self-criticism
- To break down the process of criticism into single component parts which can then be used to refine techniques of self-assessment.[68]

(b) Affective listening (attentiveness, willingness, concentration)

The affective domain consists of awareness, willingness to perceive, responsiveness, estimation of values and the characterization of a personal system of values. Thomas Regelski listed the following variables of affective thinking:

> "To respond intuitively, to interpret freely, to prefer, to enjoy, to characterize in terms of 'feeling', to create or organize 'subjectively', to choose on the basis of 'feel'."[69]

Referring to German school music, Heinz Meyer pointed to the fact that the domain of cognitive listening is mainly addressed in this field. According to him, the affective domain regarding attentiveness should also be included in training the ear. He suggested that one of the goals should be the development of attentiveness, where the goal is merely to make students aware of what is heard. Meyer criticised music education for seeing the development of attentiveness solely as a medium, a motivation factor to reach other goals. He referred to the taxonomy of Bloom et

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65 Edwin E. Gordon, **Learning Sequences in Music - Skill, Content, and Patterns.** Chicago: G.I.A., 1988 pp. 10-18.

66 Karl W. Brühl, **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978 p. 7.

67 Richard Colwell, **The Evaluation of Music Teaching and Learning**. Englewood Cliffs, New Jersey: Prentice-Hall, 1970 p. 96.

68 George Pratt and Michael Henson, "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education,** 4/2 (1987) pp. 117-135.

69 Thomas A. Regelski, **Principles and Problems of Music Education**. Englewood Cliffs, New Jersey: Prentice-Hall, 1975 p. 210.

al., where attentiveness was presented in three levels, namely awareness, willingness to receive and controlled or selected attention (concentration). Meyer pointed out that the development of attention stops as a rule when the first level is reached, because of the fact that the attention is normally not focused on music, but on what has to be learned. He quoted the mathematician Martin Wagenschein who said that when the subject has only a medium function, the teacher and student do not have time to really make contact with the subject. This unfortunately does not exclude the fact that one can talk about the subject. Wagenschein continued that an awareness of the subject relates to something deeper and more comprehensive than a mere intellectual effort. Meyer explained that the pressure to learn something from every music example, or to reflect on what was heard, often creates feelings of uneasiness in students which can be compared with the essay that has to be written after a school outing. It is important to note that the ability to discuss or write about the subject has not been hurt. What is spoiled is the music or the school outing.[70]

One aspect of the affective goal thus is to enjoy music. Unfortunately, only Christian Grube mentioned this important aspect in his article on sight singing as part of a choir rehearsal.[71]

Brendel pointed out that anticipation, which is an aspect of awareness, depends on experience. Comprehension depends on the relation of pre-knowledge and innovation to each other. If the heard material contains too much known material, boredom comes into play, whereas too much innovation leaves the listener with the feeling of not comprehending anything. In order to foster attentiveness, care should be taken to keep the balance between the known and the unknown.[72]

Finally, knowledge about the reasons for developing the ear will nourish attentiveness. Pratt and Henson formulated the following short-term goals:

> "To identify what aural skills musicians actually need and use; To awake students' concepts of what constitutes Aural Training; To foster the idea that aural ability can be developed everywhere, all the time, and with any audible sound"[73]

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70 Heinz Meyer, "'Aufmerksamkeit' als Lernziel der Hörerziehung" in **Musik und Bildung**, 63/5 (May 1972) pp. 227-231.

71 Christian Grube, "Ist Blattsingen wirklich so schwer?" in **Musica**, 43/3 (May/June 1989) pp. 210-214.

72 Gisela Distler-Brendel "Befähigung zum musikalischen Hören als zentrales Lernziel des Musikunterrichts" in Bernhard Dopheide (Ed.), **Hörerziehung**. Darmstadt: Wissenschaftliche Buchgesellschaft, 1977 p. 229.

73 George Pratt and Michael Henson, "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) pp. 117-135.

(c) Psychomotor skills (Practice-based skills for support in other subjects)

Three levels of the psychomotor domain (knowledge of movements to be performed, practice and automatism of motoric skills) were defined by Bloom et al.

> "This behavior usually refers to the development of the muscular action and neuromuscular co-ordination necessary for skilled behavior such as musical performance."[74]

All the ways of demonstrating aural comprehension fall in the psychomotor domain because physical engagement is always present in some form or another. The goal of developing psychomotor skills implies that skills to support other subjects, e.g. Instrumental Performance, Music Theory, Conducting and Eurhythmics should be developed. There should be a direct contact between aural exercises and the musical reality.[75]

1.2.4 The hierarchy of long-term goals

In the following diagram all the long-term goals discussed appear in a ranking order, starting with the simplest and ending with the most complex mental processes involved. The form of a pyramid was chosen in order to portray this characteristic of the hierarchy of goals. It is, however, important to note that this figure cannot portray the multi-dimensional character of the goals of Aural Training. There are different levels of achievement that can be reached within each goal, which in some cases are a prerequisite for the achievement of other goals. A certain level of inner hearing is, for instance, a prerequisite to develop a practical skill such as sight singing. It is however not necessarily a prerequisite for the recognition of a simple modulation. The two levels indicated within each goal by dotted lines, do not represent the exact number of levels. The number two was only randomly selected in order to illustrate the fact that there is more than one level.

Although the goals were organised from the simplest to the most complex, this does not imply that, for example, creative skills should only be included when all the other goals have been achieved. The creativity tasks completed by a novice could, for instance, be the completion of a given phrase by singing, whereas for an advanced student it could be the improvisation of a two-part invention. The ranking order thus is by no means an indication of the importance of the goals, or an indication of the exact order in which the goals should be achieved. Because of the different levels of accomplishment present in each goal, the achievement levels of the different goals can overlap. The development of musical understanding thus is a cyclical process which is represented by a spiral. At the lower end of this process is the potential musician, with the ideal listener at the very top of the spiral. In order to reach the primary long-term goal defined earlier, or to become the ideal listener, it would be necessary to move through several pyramids, starting each time at a higher level. This is indicated by the small pyramid at the top.

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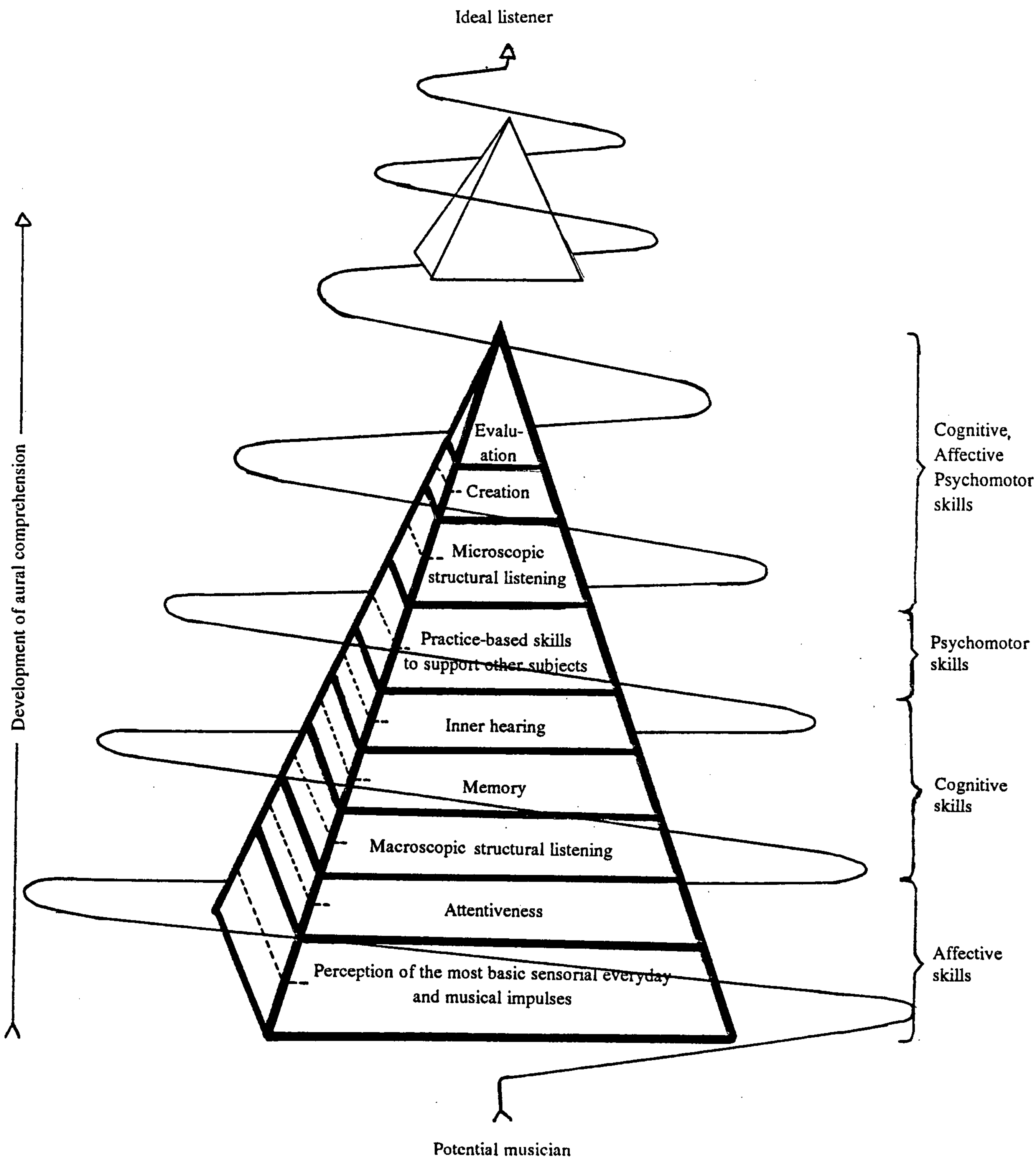
74 Thomas A. Regelski, **Principles and Problems of Music Education**. Englewood Cliffs, New Jersey: Prentice-Hall, 1975 p. 213.

75 Karl W. Brühl, **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978 p. 7.

Fig. 2.2 Hierarchy of long-term goals



2. TEACHING IDEOLOGIES

The teaching environment in which the goals of Aural Training can be achieved is dominated by different teaching philosophies or ideologies. Michael Rogers maintained that all aspects of theory teaching, including Aural Training, should be patterned by design and not by chance.

> "It is not possible to avoid the question of philosophical orientation by eliminating the preliminary (actually constant) soul searching that is a normal part of setting up or teaching a course; to *not* decide on a particular approach is itself a decision - decision for confusion and for a course with no bearings."[76]

The fact that teaching ideologies have an influence on listening strategies can be clearly seen in the research results of Rita Aiello et al., who investigated musicians' problem-solving approaches to music listening at the Julliard School of Music in New York. They came to the conclusion that trained musicians differed in their approaches to music listening. Whereas some musicians heard isolated features of the musical patterns, others interpreted what was heard in a holistic, gestalt way. In the first type of hearing, single musical elements were described with brief words. The second type of hearing was dominated by the recognition and description of complete units, "chunking" the music into phrases or sections.[77] It is the researcher's opinion that these differences in aural perception were the product of different teaching approaches.

Four different teaching ideologies can be determined and are discussed under the following headings:

2.1 Isolation vs Integration and Comprehension
2.2 Fragmentation vs Holism

Combinations of these ideologies often appear in teaching practice. The merging of isolated and fragmented approaches, on the one hand, and comprehensive and holistic approaches, on the other hand, most often appear. Other combinations are also possible but do not occur frequently in the educational process.

2.1 Isolation vs Integration and Comprehension

In the **isolated approach** Aural Training is dealt with in separate classes, isolated from other subjects. The nature of this isolation can be twofold, either treating Aural Training as a "lone" subject in which the main focus is placed on repeated drill exercises, or as a separate subject in which cross-references are made to other subjects. The latter form represents a combined isolated, comprehensive approach which is in its nature not isolated from other subjects, but is simply a product of curriculum planning. When reference is made to the isolated approach, this second form is not meant.

Another manifestation of the "lone ranger syndrome" can be seen in classes where the instruction time is divided between different subjects, e.g. Aural Training and Music Theory, or Aural Training in the instrumental lesson, with each subject treated as an autonomous domain. An example of this approach can be seen in the timpani instruction

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[76] Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 p. 15.

[77] Rita Aiello, J.S. Tanaka and Wayne C. Winborne, "Listening to Mozart: Perceptual differences among musicians" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 289.

program that was developed by Michael Gill.[78] A computer-assisted self-instruction course aimed at helping the student with the aural recognition of intervals formed part of his program. Gill excluded rhythmical training which forms the heart of percussion playing, concentrating merely on the pitch parameter in order to enable the tuning of the timpani.

Apart from the majority of Aural Training workbooks in which isolated exercises are presented with no reference to other music subjects, further examples of the isolated approach can be seen in the Aural Training syllabi of the University of South Africa, The Associated Board of the Royal Schools of Music (United Kingdom) and Trinity College of Music (United Kingdom).[79] Since about the 1980s there has been a general move back to separated Aural Training classes in the United States of America, possibly as a result of the competency-based learning philosophy of the 1970s, in which 'back-to-basics' played an important role.[80] This separation often results in fragmentation.

> "The community of musicians has never before been confronted with the level of fragmentation that exists today. Analytic method is divorced from musical reflex, composers from performers, and conventional repertoire from new repertoire. In this century these polarities have developed because of the momentum of compartmentalization - a trend that has played an important role in many aspects of culture, education, and technology. Countertrends in specific areas of human endeavor and in the work of extraordinary, multi-faceted people have asserted themselves sporadically, but not with the same, sustained persistence as the overriding tendency toward specialization."[81]

It is conspicuous that almost no reference is made in the Aural Training literature to justify the isolated teaching approach. Authors who applied this approach in their workbooks did not comment on the its validity. Reference is most frequently made in the form of criticism. Brühl, who criticised the fact that the contents of many textbooks were based upon an isolated approach with the main emphasis on intervals, chords, and major and minor tonality, is only one example among many.[82] A further criticism, namely a possible negative outcome of an isolated approach to Aural Training, was described by Rupert Thackray:

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78 Michael James Gill, **Zyklus: A Performer's Analysis; A Video Taped Timpani Method utilizing Computer assisted Instruction for Ear Training.** Doctoral dissertation, The University of Southern Mississippi 1988. Ann Arbor, Michigan: University Microfilms International, 1988 p. 88.

79 University of South Africa, **Practical Musicianship (Aural Tests) Appendix B, Written Examination Syllabuses.** Pretoria: UNISA, 1985.
The Associated Board of the Royal Schools of Music, **Aural Tests Parts I-IV.** London: ARSM, 1972.
Trinity College of Music, **Sample Ear Tests.** London: Trinity College of Music, [n.d.].

80 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 p. 19.

81 Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990 p. xvii.

82 Karl W. Brühl, **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978 p. 1.

> "Sometimes pupils are rushed through a 'crash' course to prepare them for the aural tests involved in an examination and the fact that pupils with serious aural weaknesses can often manage to pass examinations regardless does not encourage teachers to devote much time and energy to this aspect of their work."[83]

According to Thackray one of the reasons why Aural Training is often treated as a separate subject, is that insufficient provision is made for aural exposure in the overall study of music. He critisised theory and harmony lessons where not a note is played, History of Music classes where book knowledge dominates, and Analysis classes which merely involve "eye-work".

Rogers was the only author found who reflected on the arguments of the proponents of a separated approach. One of their main arguments is that intellectual comprehension and hearing abilities develop at different rates. As a rule, the ear develops slower than the eye and mind. Because of this a combination of written and aural work can sometimes in the integrated approach inflict an unnaturally slow pacing on written topics. For maximum pedagogical effectiveness, taking into account practical teaching reasons and the inherently different nature of skills, they must each be adapted for the individual courses. According to this argument the evaluation of separated courses permits a clearer and stricter monitoring of standards.

The counterpart of the isolated approach is the **integrated, comprehensive approach** which, according to Rogers, became popular during the 1950s in the United States of America. This approach was meant to correct the splitting of theory programs into numerous different classes (e.g. Part-Writing, Dictation, Sight singing) which were often taught by separate instructors with little use of common analytical principles. The integrated, comprehensive approach guards against merely producing technically-orientated 'pencil-and-paper' musicians, which often is the result of an isolated approach.[84]

The words *integrated* and *comprehensive* indicate that there are two manifestations of this unsegregated teaching ideology. There is, however, only a marginal difference between them. Integration points to the fact that all music subjects should be taught from an auditive point of view. Aural work is also underlined in the comprehensive approach with the main emphasis, however, on the central nature of the subject in which all subjects are combined in an interrelated manner.

In the *integrated approach* Aural Training is incorporated into all other subjects such as Music History, Music Theory, Analysis, Instrumental classes, etc. Güldenstein presented examples of the integration of Aural Training into other subjects. In the Analysis classes students can, for example, sing motives, fugue themes and tonal or real answers.[85] Arnold Möller integrated the teaching of elementary Music Theory principles with accompanying aural

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83 Rupert Thackray, "Some Thoughts on Aural Training" in **The Australian Journal of Music Education,** October 1975 p. 25.

84 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 16-17.

85 Gustav Güldenstein, **Gehörbildung für Musiker - Ein Lehrbuch.** Basel: Schwabe, 1971 pp. 14-15.

exercises, e.g. the theoretical knowledge of a chromatic scale is directly followed by singing the scale.[86] The fact that most Music Theory books emphasised intellectual knowledge at the cost of sound experiences was strongly criticised by Paul Schenk. He stressed the fact that Aural Training and Music Theory should form a unity in which the same pedagogical themes should be treated alongside each other.[87]

Several authors recommended the integration of Aural Training into instrumental classes. The main reason for this is that many teachers primarily pay attention to the technical skills of instrumental performers. According to Stanley Schleuter, the aim should rather be "to develop students who have something to perform rather than students who just perform something."[88]

At the 1976 D-A-CH Conference in Regensburg, Neumann, Resch, Wolters and Zehetmair read lectures on the theme of integration.[89] Hans-Dieter Resch urgently called upon all private instrumental music teachers, as well as music teachers in public schools, to integrate systematic Aural Training into instruction from the very first lesson. Referring to instrumental teaching, he soothed general fears that such an integrated approach can interfere with a rapid progress in playing abilities. On the contrary, Resch pointed to the fact that the student will benefit from the gain in general musicianship, which includes the ability to recognise patterns swiftly. Through the constant development of aural knowledge of intervals, chords, tonal and atonal relationships, musical memory can be developed in a relaxed, systematic way.

Bernita Douglas developed a model for integrating Aural Training into piano lessons. According to her, Aural Training should form part of the whole piano lesson using the pieces that the pupil is playing as instruction material. Through this approach the pupil has the opportunity to develop his musicianship while working with musical entities within a musical context. The end effect will be a pianist who is able to rise above the level of mere technical performance.[90]

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86 Arnold Möller, **Elementare Musiktheorie und Gehörbildung mit Aufgaben für den Selbstunterricht.** Frankfurt: Zimmermann, 1985.

87 Paul Schenk, **Schule der musikalischen Gehörbildung - I. Teil: Gehörbildung Unterstufe und Musikkunde.** (Eight booklets). Trossingen: Hohner, 1952, preface.
This methodological approach is an example of an integrated fragmented approach to Aural Training.

88 Stanley L. Schleuter, **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequences.** Kent, Ohio: The Kent State University Press, 1984 p. xii.

89 Annemarie Neumann, "Musiktheorie und Gehörbildung unter instrumentimmanenten Aspekten" (pp. 101-104).
Hans-Dieter Resch, "Gedanken über eine systematische Gehörbildung im Instrumentalunterricht" (pp. 83-85).
Klaus Wolters, "Gehörschulung im Klavierunterricht" (pp. 105-107).
Helmut Zehetmair, "Spezielle Aufgaben einer Gehörbildung im Violinunterricht" (pp. 91-94).
All in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

90 Bernita Douglas, **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig.** Unpublished Master's thesis, University of Stellenbosch 1990.

Basically the same teaching ideology was portrayed by Schleuter who applied content and learning sequences to instrumental teaching. The goal of his book is to teach tonal and rhythmic understanding while developing instrumental technique. One of the main principles in his approach is that sound should be emphasised before symbols, and he recommended the singing of tunes before they are played, as well as the playing of familiar tunes without notation, "by ear". Rhythm readiness should be developed by means of kinesthetic response by moving to music (dancing and free movements). An example of a first lesson on a woodwind instrument is used to demonstrate how students can familiarise themselves with the tonal patterns *doh re mi* and *mi re doh*. The students should be able to sing these patterns, using tonal syllables before continuing with the next step. Other steps involve learning the correct fingering used through observation, using the two patterns to play familiar songs ("Mary had a little lamb" and "Hot cross buns") by ear, and transposing the songs to other keys. According to Stanley the advantages of this approach are numerous. Not only are musical sound and tone quality always emphasised first, but learning new fingerings and technical development are assisted with a small vocabulary of tonal patterns. Technique thus results from musical activity.[91]

The *comprehensive approach* refers to a tertiary curricular arrangement that attempts to combine and interrelate subjects such as Music Literature, Harmony, Counterpoint, Formal Analysis and Aural Training within a single unified semester course, called Comprehensive Musicianship. The rationale behind this philosophy is to connect elements and ideas from the various music disciplines, in order to teach students to understand music as a unified whole rather than as detached fragments.[92]

General specific traits of Comprehensive Musicianship (CM) are as follows:

(a) All style periods are treated as being equally important.
(b) Real compositions in a variety of textures and mediums, as opposed to artificial exercises in four-part chorale style, form the core of study.
(c) Parametric analysis - both written and aural - is prominently featured.
(d) Composition and/or improvisation projects, not just mechanical drills, are stressed.
(e) Rehearsing and performing of student compositions or other compositions in class are part of many CM programmes. Just as swimming cannot be learned from a book, real music learning rarely takes place without this live contact.
(f) All activities and components are related to one another and lead to a unified and complete understanding. The ultimate goal is to rectify the compartmentalization of music instruction by incorporating holistic learning.[93]

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91 Stanley L. Schleuter, **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequences.** Ohio, Kent: The Kent State University Press, 1984.

92 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 16 and 20.

93 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 20-21.

Although the appearance of the subject Comprehensive Musicianship on a tertiary level is a North American phenomenon, subjects with the same traits can be found in German tertiary music education.[94] The following are examples of such courses:

Hochschule der Künste Berlin, Winter semester 1989/90: "Höranalyse notierter und nichtnotierter Musik" (Aural analysis of notated and unnotated music); "Form - Formenlehre - Hören" (Form - Form Analysis - Listening).

Hochschule für Musik Detmold, Winter semester 1990/91: "Abhörpraktikum: Das Streichquartett im 19. Jahrhundert" (Aurally based practical course: The string quartet in the nineteenth century).

Hochschule für Musik und Theater Hannover, Winter semester 1990/91 and Summer semester 1991: "Hörkolloquium: Großbesetzte Vokalmusik" (Aural colloquy: Vocal music with a large setting).

Staatliche Hochschule für Musik Freiburg im Breisgau, Summer semester 1991: "Einführungskurs in die angewandte Gehörbildung mit orginal-instrumentierten Literaturbeispielen" (Introductory course in applied Aural Training with music literature examples in their original orchestration); "Stilkunde" (The Study of the Art of compositional style periods).

Staatliche Hochschule für Musik Karlsruhe, Winter semester 1990/91: "Analytisches Hören; Satztechniken des Spätbarock und Übergang zur Wiener Klassik mit Hörübungen" (Analytical listening: Formal techniques of the Late Baroque and the transition to the Viennese Classic with aural exercises).

Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart, 1988-1992: "Höranalyse in Verbindung mit Formenlehre" (Aural Analysis in connection with Form Analysis classes); "Repetitorium der Musikgeschichte - Anleitungen zum Erkennen und Bestimmen von Klangbeispielen aus dem Mittelalter bis zur Gegenwart" (Revision course on Music History - Guidance for the recognition and determination of acoustical examples from the Middle Ages to the Present).

Rogers addressed certain problems that surround Comprehensive Musicianship Classes. A few of them are: the lack of appropriate textbooks, difficulty in calibrating grading factors, lack of suitable teachers with a broad enough background of various subjects in order to explain relationships between details and their whole contexts, lack of time for in-depth study (the issue of breadth vs depth is raised).[95]

2.2 Fragmentation vs Holism

The fundamental difference between the fragmented and holistic approaches can be described by the terms *microscopic* (focus placed on the smallest unit), and *macroscopic* (a wide-angle approach in which the whole is the starting point).[96] The terms *perceptual* (accurate perception of sonic events) and *structural* (comprehension of musical rela-

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94 Observations made by the researcher at different *Musikhochschulen*, as well as information found in Directories of Lectures (*Vorlesungsverzeichnisse*) which are published every semester at every *Musikhochschule* in Germany.

95 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 22-23.

96 "In micro listening the concentration is toward the note by note, chord by chord progress of the composition dwelling primarily on the details of the moment. In macro listening the emphasis is on the relationships of the larger units such as phrases, periods, and sections."
Bruce Benward, **Workbook in Advanced Ear Training: Teachers Dictation Manual.** Dubuque, Iowa: Wm.C. Brown, 1961 p. ix.

tionships) are also used in the same context.[97] Richard Ashley also referred to the microscopic and perceptual as the *atomistic*.[98]

In the **fragmented approach**, an Aural Training course is as a rule started with the recognition of simple diationic intervals, scales and chords, and ends with complex homophonic, polyphonic and chromatic one to four-voice dictation, taken from the music literature. In this approach all aural knowledge thus evolves from one cell.

The fact that beginners tend to think "purely in terms of atoms - of the smallest units out of which the sum could be constructed" was underlined by Gould. According to him, knowledge of the construction of the elementary components of tonal music is the passport to a wider world of musical relationships. He called this first level of thinking the perceptual level, with the next level that of structural thinking. Pitches and intervals are taken as perceptual entities out of which motives, themes and arpeggiations are, for example, constructed.[99] Samuel Adler provided an example of this approach in which rhythmic and melodic elements were separated. He started with second intervals, then thirds, fourths, etc. and recommended that students should combine exercises such as taking a rhythmic exercise and adding pitches in order to create a melody by using a Phrygian or other modal scale.[100]

Another aural instructor who based his teaching ideology on starting with a single cell is Max Battke. The essence of his justification for using a fragmented approach is based on the harmonic overtone series. According to him the roots of music theory can be found in the natural major triad which consists of the fourth, fifth and sixth overtones (relationships 4:5:6). From this Battke derived that Aural Training should start with triads. Drawing on his own teaching experiences, he observed that beginner pupils who often could not distinguish between second intervals, could distinguish between different triads. It is, however, astounding that Battke did not apply this theory to his two other sight singing texts, which start with second and third intervals.[101]

Although Music Education is dominated by the fragmented approach, there is growing criticism of this approach.

> "...the identification of intervals seems to be a major component of many ear training and sightsinging texts, CAI music software, and presumably, most ear training programs. But at the same time, many aural

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97 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 2.

98 Richard Douglas Ashley, **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982 p. 100.

99 Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 pp. 1-2.

100 Samuel Adler, **Sight Singing**. New York: W.W. Norton, 1979.

101 Max Battke, **Die Erziehung des Tonsinnes - 304 Übungen für Ohr, Auge und Gedächtnis.** Berlin-Gr. Lichterfelde: Chr. Friedrich Vieweg, 1905.
Primavista - Eine Methode, vom Blatt singen zu lernen. West-Berlin: Albert Stahl, 1900.
Unerschöpfliche Übungen für das Primavistasingen und für den Rhythmus in Form von achttaktigen veränderbaren Notenreihen, verwendbar auch für das Musikdiktat. Berlin-Gr. Lichterfelde: Chr. Friedrich Vieweg, 1913.

skills teachers question their importance - or the value of the method by which they are most often taught. A similar situation exists with regard to triads."[102]

William Thomson commented on the research done by Ann Blombach and Regena Parrish, who investigated the effectiveness of pre-determined isolated interval drills in an easy-to-difficult set of groupings, as opposed to randomly selected groupings of intervals. Although the placement of less easily confused intervals in small groups for beginner practice (with a gradual increase in both the size of the groups and the difficulty of distinguishing between intervals in the groups), is supposedly more effective than using groups of randomly chosen intervals, the latter appeared to be at least as effective and were apparently more so in some cases. They concluded that their results challenged the validity of some of the most basic Aural Training assumptions.[103]. Thomson, however, pointed out that the "character" of an interval is influenced by its context, and maintained that ignorance or insufficient respect for this simple principle has "plagued" studies of intervals and melody throughout the history of empirical psychology. He further stated that until experimental studies (and pedagogy) respect this reality, the perceptual nature of intervals will always be rapped in mystery. Regarding the adequacy of drill exercises of isolated intervals, he wrote:

> "In the early and gullible years of my teaching career I marvelled on occasion at a few boastful colleagues who informed me of their individual roads to ear-training success. All one must do, one of them once told me, was spend the first two weeks with freshmen mastering aural interval recognition. From there on, the sailing was as on glassy seas. Some decade or so after these rash promises were made, I was forced to conclude, reluctantly, that my informants were either sorcerers or liars. Pitch intervals yield to no such 'mastery', whether in two weeks or in two years."[104]

The main criticism of the fragmented approach is that isolated intervals, chords, modulations and often "self-composed" dictations form the core of Aural Training, without referring to the musical context or larger relationships in examples from the music literature.[105] The constant occupation with detail draws the attention from the entire organism.[106] Furthermore, Leopold Spitzer pointed out that an isolated musical element such as an interval is only a measurable unit in which the true identity of its character is not revealed. He compared the fact that the character of an interval is influenced by its environment with the phenomenon of optical illusion.[107] A mere "quantified" approach ('Aha, a fifth, a dotted note') does not allow the conscious penetration (thinking processes, emotional

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102 Paula Telesco, "Contextual Ear Training" in **Journal of Music Theory Pedagogy**, 5/2 (Fall 1991) p. 179.

103 Ann K. Blombach and Regena T. Parrish, "Acquiring Aural Interval Identification Skills: Random vs Ordered Grouping" in **Journal of Music Theory Pedagogy,** 2/1 (Spring 1988) pp. 113-131.

104 William Thomson, "What is an interval?" in **Journal of Music Theory Pedagogy,** 2/2 (Fall 1988) p. 321.

105 Theo Hirsbrunner, "Anleitungen zum verstehenden Hören während des Unterrichts in Formenlehre und Musikgeschichte" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 63.

106 Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung**, 63/5 (May 1972) pp. 232-233.

107 Leopold Spitzer, "Gehörbildung: Intervall oder stillbezogene Phrase?" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 99.

experiences and willingness) of what was heard. Not only is the ear involved in Aural Training, but the whole human being.[108]

The fragmented approach thus is by no means a guarantee for the understanding of larger form schemes or inner relationships between sounds.

> "Even the student who is able to notate a passage accurately may not be able to make any applicable musical observations of what he has just heard."[109]

Traditional Aural Training as a rule meets the necessary requirements for structural hearing, but seldom develops beyond this stage. In most Aural Training texts, knowledge is rarely considered adequate to handle entire pieces.[110]

Referring to the above criticism, Irene Matz read a lecture at the *6. Stuttgarter Sommerkurse 1990* on the theme "Entformalisierung des Gehörbildungsunterrichts" (Abandoning [traditional] concepts of Aural Training).[111] The essence of her lecture was that teachers should get rid of drill exercises which have the sole purpose of acquainting students with certain models. Instead, examples from the music literature should be used in order to acquaint them with the aesthetic qualities and emotional associations of what was heard.[112]

The **holistic approach** has developed as a result of several teachers' dissatisfaction with the fragmented approach, and because of the applications of the results of newer trends in music psychological research to Aural Training.

Brink and Hiranpradist explained that music education was dominated during the first half of the twentieth century by the Behaviourist viewpoint on learning.[113] The Behaviourists concentrate exclusively on observable behaviour and believe that the only cause of behaviour is an active and changing environment. Listening behaviour cannot be improved until the right external conditions are present. As a result of this approach, proper behaviour is reinforced by repetition and drill until the correct response is consistently given. It follows that Aural behaviour can only be expressed in terms of being correct and incorrect. The fragmented approach is thus a result of the Behaviourist school of psychological thinking.

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108 Hermann Sprenger, **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.] p. 6.

109 Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory,** 18/1 (Spring 1974) p. 77.

110 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 101.

111 According to the **Cassells Wörterbuch** (München: Compact, 1968 p. 130) the prefix *ent-* in combination with other words indicates establishment of, or entry into a new state, or the abandonment of an old state.

112 Lecture "Hören neuer Musik" read by Prof. Irene Matz at the *6. Stuttgarter Sommerkurse 1990, Hochschule für Musik und Darstellende Kunst Stuttgart* in 1990.

113 Barbara Ruth Hiranpradist, **Formal Operational Thought as a Dimension of Music Listener Behavior.** Doctoral dissertation, Michigan State University 1986. Ann Arbor, Michigan: University Microfilms International, 1986 pp. 1-5.

In contrast to this, the Cognitive approach was developed. Behaviour was examined as the result and manifestation of inner mental processes. The human mind is believed to interact with the environment and not controlled by it. Listening involves sensation, perception, imagery, retention, recall, problem-solving and thinking. Research that deals with the listening process is therefore important for Aural Training.[114]

According to psychological research results, musical perception does not start with recognizing details and then at a later stage entireties, but moves inversely from the sum total to the details.[115] Margaret Grace O'Connor found that seventh and eighth grade junior high school students had "the cognitive ability to discriminate aurally, two, three, and four musical concepts simultaneously." She continued, "aural discrimination of selected musical concepts, as single discriminations, or as multiple discriminations, may be developed effectively within a total musical context."[116]

This means that the musical context and musical relationships should be the two main components in the teaching of Aural Training. Students are to begin with small but complete musical structures, with actual compositions. Particular sonic events can be isolated briefly for concentrated analysis, which points to the fact that both structural and perceptual tasks can be included in the holistic approach. It is important that both tasks should be included in Aural Training to avoid the danger of never being able to deal with wholes on the one hand or, on the other hand, of never moving beyond the stage of the broad and general features of a composition. There must be a constant moving back and forth between perception and synthesis,[117] an approach that was also described by Paul Hindemith.[118]

3. THE CONTENTS AND TARGET GROUP OF AURAL TRAINING

The **contents** of Aural Training are a function of the chosen teaching ideology. An isolated, fragmented approach would differ in contents from a comprehensive holistic approach. The influences of the fragmented approach can, for example, be seen in the fact that most dictation exercises seldom exceed the length of a phrase and are confined to

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114 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 12-31.

115 Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung,** 63/5 (May 1972) p. 233.
A more detailed description of *Gestalt* Psychology and its relation to Aural Training is presented in Chapter Four.

116 Sister Margaret Grace O'Connor "Development of Discriminatory Music Listening Skills in the Junior High School utilizing Programmed Instruction" in **Dissertation Abstracts International**, 37/3 (September 1976) p. 1446-A.

117 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 156.

118 Paul Hindemith, **Elementary Training for Musicians**. London: Schott, 1949 p. 182.

pitch-time factors as performed on the piano. Examples are often limited to late eighteenth-and nineteenth-century style periods.[119]

As mentioned in the previous section, this fragmented approach has been criticised by many authors. Based on this criticism, and on music psychological grounds, the contents that should be included in an Aural Training course are discussed from a holistic, comprehensive point of view.

Listening is a physiological-psychological process that is influenced by the biological and psychological composition of the human being. When music is heard, an acoustical impulse is not only perceived, but also subjectively experienced and evaluated.[120] Because of this involvement of aesthetic emotional experiences, Aural Training should deal with "real" music.

> "All Ear Training work must be based upon Musical Appreciation; the technical side must never be divorced from the aesthetic, and the whole aim of the study must be the fostering of *real musical perception* in the pupil."[121]

"Artificial" self-composed exercises which often are isolated from a musical context, usually do not meet the requirements of "real" musical perception. This is not to say that all "self-composed" phrases are harmful or of poor quality. Pedagogically speaking, they may have some value and students can certainly learn from them, but in most textbooks with self-composed exercises this is not the case. Not all Aural Training teachers are composers and exercises tend to be mechanical, existing merely of rows of connected pedagogical problems which the student has to solve.

Real music perception does not only have an aesthetic facet, but also involves knowledge and understanding of what one is hearing. (This is in fact the general goal of Aural Training as was explained in section 1.2.) Ashley explained that musical knowledge has two main aspects. Firstly, musicians are expected to become acquainted with an adequately large number of musical works. Secondly, a large general body of knowledge about music (style characteristics, understanding how compositional techniques work, being able to place a work in a general historical context) is expected.[122] Aural Training cannot thrive on the basis of a small repertoire. A person who is acquainted

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119 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1989 pp. 183-184.
Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 41.

120 Karl Gustav Fellerer, "Der Wandel des Hörens im 16. Jahrhundert" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962 p. 7.

121 Stewart MacPherson and Ernest Read, **Aural Culture based upon Musical Appreciation, Part I.** London: Joseph Williams, 1953 p. 1.

122 Richard Douglas Ashley, **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982 pp. 25-26.

with various styles of music will be able to understand more aurally.[123] The inclusion of music from a variety of musical style periods was emphasised by several authors such as Benward, Böhm, Levin and Martin and Ottman.[124] Sprenger suggested the incorporation of musical works from the main instrument literature of the student as instruction material, as a way of fostering knowledge of the standard literature and to encouraged students to delve deeper into the musical repertoire.[125] Justin London, amongst others, furthermore advocated the use of Pop Music in Aural Training.[126]

Regarding the incorporation of music from the twentieth century, there is a growing call for a greater awareness of this style period with all its different branches. Brian Dennis pointed out that the health of an art is in danger if those who teach it fall too far behind those who practise it.[127] Experience with atonal music has shown that concentrated listening, which forms a major part of Aural Training, also serves as a way to break down students' resistance to New Music.[128]

Since Lars Edlund criticised conventional Aural Training for being limited to the major/minor style periods in 1963, a number of books have been published on this subject.[129] Apart from the fact that authors started to include music from the twentieth century in their workbooks,[130] Haas and Karkoschka developed a course in which only twentieth century-music features.[131] Hilda Bester concentrated solely on atonal music in her research and Elizabeth Marvin

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123 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 p. 13.

124 Kurt Böhm, "Das Konzept der Gehörbildung an der Musikakademie und am Konservatorium Zürich" in **Schweizerische Musikzeitung,** 122/6 (November/December 1982) pp. 373-374.
Bruce Benward, **Workbook in Advanced Ear Training - Teachers Dictation Manual.** Dubuque, Iowa: Wm.C. Brown, 1961 p. ix.
Robert D. Levin and Louis Martin, **Sight Singing and Ear Training through Literature.** Englewood Cliffs, N.J.: Prentice-Hall, 1988 p. xvii.
Robert W. Ottman, **More Music for Sight Singing.** Englewood Cliffs, N.J.: Prentice-Hall, 1981 p. iii.

125 Hermann Sprenger, **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.] p. 15.

126 Justin London, "'One Step Up': A Lesson from Pop Music" in **Journal of Music Theory Pedagogy,** 4/1 (Spring 1990) pp. 111-114.

127 Brian Dennis, **Experimental Music in Schools - Towards a New World of Sound.** London: Oxford University Press, 1970 p. 1.

128 Hermann Grabner, **Neue Gehörübung.** Berlin: Max Hesses, 1962 p. 3.

129 Lars Edlund, **Modus Novus - Studies in Reading Atonal Melodies.** London: J. and W. Chester, 1963 p. 13.

130 For example: Roland Mackamul, **Lehrbuch der Gehörbildung, Bänder I und II.** Kassel: Bärenreiter, 1969.
Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979.

131 Hubert Haas and Erhard Karkoscka, **neue musik hören - Eine Hörerziehung mit neuer Musik in Theorie und Praxis.** Rohrdorf: Rohrdorf, 1981.

proposed a one semester contour-based model designed especially for the teaching of non-tonal music at a tertiary level.[132] The most recent publication that could be found on this theme is by Michael Friedmann.[133]

The incorporation of examples from the music literature in Aural Training consequently implies the inclusion of all the parameters of music, treated within a musical context. As an effect of this, different timbres (instruments) should also form part of the Aural Training lessons. The mere use of the piano as opposed to other instruments has been criticised.[134] Sprenger pointed out that the exact duration of tones could not be perceived when using the piano. He was, however, sceptical as to whether the use of "sound illusions" as they appear on cassettes and other electronic devices would be able to assist "live" hearing. As a solution to this problem Sprenger recommended that the first hearing of a dictation exercise should be played from a recording in which the whole orchestrated performance is heard, and not only the melody. In the following stages the phrase should be played on the piano in a slower tempo.[135] Kühn warned against a counter-reaction in the total omission of the piano. The versatile use of the piano, however, should never become an excuse for laziness or monotonous Aural Training.[136]

Another aspect that should be included in Aural Training is the application of a wide spectrum of methods. The multi-dimensional nature of music can never be captured in two or three methods. Janet McLoud McGaughey criticised textbooks for limiting their teaching approaches to Sight singing and Dictation.[137]

To summarise, four aspects of the contents of Aural Training are thus important:

(a) Examples from the Music Literature should form the core of Aural Training.
(b) All style periods should be presented.
(c) All music parameters should be incorporated.
(d) A variety of methods should be applied.

The **target group** of Aural Training (the people who should participate in Aural classes) includes all persons who are exposed to some form of musical training. On the Primary and Secondary school music level, Aural Training should be included as a form of music appreciation and as a way to become acquainted with and understand music. Pupils taking instrumental lessons should be exposed to a more in-depth form of Aural Training. On the third, tertiary level it is unthinkable to have musicians without a trained ear.

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132 Hilda Bester, **Gehooropleiding in die Twintigste eeu met spesiale verwysing na Nuwe Musiek.** Unpublished Master's thesis, University of Stellenbosch 1983 p. 25.
Elizabeth West Marvin, **A Generalized Theory of Musical Contour: Its Application to Melodic and Rhythmic Analysis of Non-Tonal Music and its Perceptual and Pedagogical Implications.** Doctoral dissertation, Eastman School of Music at the University of Rochester 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

133 Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990.

134 Hermann Grabner, **Neue Gehörübung. Berlin:** Max Hesses, 1962 p. 4.

135 Hermann Sprenger, **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.] pp. 12-13.

136 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 p. 17.

137 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 Preface.

Within this realm of all people who are involved in music, there are two types of hearers - those with relative, and those with perfect pitch. Whereas the relative hearer comprehends music in terms of relative inner relationships between pitches without being able to name the pitches when the beginning note name is absent, the hearer with perfect pitch possesses the extraordinary long-term memory ability of being able to name pitches without knowing the note name of a reference tone.

This definition of the perfect pitch hearer is a very general one which does not incorporate all the different facets of perfect pitch. A distinction is, for example, made between the passive (tone recognition) and active (tone reproduction) perfect pitch hearing abilities. Revesz, Wellek and Bachem developed differentiated classifying models in which they attempted to classify different types of perfect pitch hearers. Eva Marie Heyde compared the three models in a Table.[138]

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138 Eva Marie Heyde, **Was ist absolutes Hören? Eine musikpsychologische Untersuchung.** München: Profil, 1987 p. 113.

Table 2.1 Heyde: Classification models of perfect pitch appearances - Revesz, Wellek and Bachem[139]

<table>
<tr><th colspan="2"><u>REVESZ</u>
(1913, 1946)</th><th colspan="2"><u>WELLEK</u>
(1963)</th><th colspan="2"><u>BACHEM</u>
(1937)</th></tr>
<tr><td rowspan="2">Perfect pitch</td><td>Total perfect pitch
(Independent from pitch region) General hearing
(Independent from timbre)</td><td>Perfect pitch</td><td>Genuine perfect pitch</td><td rowspan="2">Perfect pitch</td><td rowspan="2">A. Genuine absolute pitch, based upon immediate recognition of tone chroma

I. Universal N*
a. Infallible (for every range of all musical tones, even noises) (7)
b. Fallible (for most musical instruments with half-tone and octave errors) (44)
II. Limited
a. As to region (8)
b. As to timbre (5)
c. To both (7)
III Borderline
a. Inaccurate (17)
b. Inaccurate and variable (2)</td></tr>
<tr><td>Partial perfect pitch
Earlier named: "regional" perfect pitch (Dependant on pitch region)
Special pitch hearing
(Dependent on timbre)</td><td rowspan="2">Actually not perfect pitch</td><td rowspan="2">Partial perfect pitch</td></tr>
<tr><td rowspan="2">Not perfect pitch</td><td>Standard tone memory/
hearing (So-called inner comparative tone)</td><td rowspan="2">Actually not perfect pitch</td><td>B. Quasi-absolute pitch, based upon a standard and the interval sense
I. With aural standard (violin a, middle piano c) (3)
II. With vocal standard (singing, humming) (10)</td></tr>
<tr><td>Regional hearing
(Bigger average error tolerance; Present in non-musicians;
With an average error of a minor third)</td><td>Not perfect pitch</td><td>Mere pitch estimation
(Also done by "unmusical" persons)</td><td>C. Pseudo-absolute pitch, described as absolute pitch by several authors, based upon estimation of tone height <u>(studied 7)</u>

* N = Number of persons who took part in Bachem's investigation Total (103)</td></tr>
</table>

In a further diagram, Heyde provided a summary of the phenomenon of perfect pitch with the requirements and factors that influence it. A translation by the researcher follows in Fig. 2.3

139 Bachem's classification appeared in Heyde's dissertation in English, and was not translated by the researcher.

Fig. 2.3 Heyde: Perfect pitch - requirements and factors of influence

Perfect pitch

Ability to correctly name tones (keys)
and (root) frequencies

Specific long-term memory ability

Inherited requirements (possibly also influenced by the environment)

Environmental influences, primarily the musical environment (degree of influence possibly also dependent on musical aptitudinal factors)

Rudiments, rules and regularities of musical practice: sound material, performance practices and teaching methods,

amongst others: Tone system/stave; Maj./min. tonality; Tempered semitone system; Frequency and nature of the use of certain tones/keys; Tuning tone norm ("Stimmtonnormierung"); Tuning tone variation ("Stimmtonschwankungen"); Instrumentation; Time moment, intensity, duration and nature of musical education; Influences of traditional opinions and perceptions, amongst other things, of the characteristics of keys

Aural habits

It is possible that a so-called "sensitive phase" exists in early childhood

Incidental learning (perfect pitch learned in the same way as the mother tongue)

Intentional learning (compare investigations concentrating on the acquisition (training) of perfect pitch)

Comparison of the heard tone/key with the inner
memory-based association system

(Un)differentiated building of categories and the nature
of the reference points depends on:

Aptitude and environmental conditional factors

Different distinctions of perfect pitch
(differential and general)

There is a tendency amongst several musicians and non-musicians to claim that absolute hearers should be excluded from Aural Training, or should only be partially included in Aural classes. Christoph Hempel, for example, recommended that students with perfect pitch should ignore the melody chapter in his book.[140]

Monika Quistorp pointed out that the perfect pitch ability can be beneficial regarding twentieth century music during the first listening stages. She however remarked that the first initial rapid reaction to what was heard is by no means an indication that perfect pitch possessors can understand modern music in its structure and contents better than relative pitch hearers. She criticised perfect pitch hearers for hearing isolated pitches without paying attention to the relationships between notes.[141] The same criticism was voiced by Hubert Haas, who indicated that many students and teachers are satisfied with a superficial approach in which all the note names of the heard notes are correctly imitated. Instead he recommended a deeper penetration into the creation process in which reproduction serves a higher purpose than imitation.[142]

John J. Barkowsky found, amongst other things, that absolute pitch possessors performed better when the time between what was heard and the response to it (response time) was shorter, while relative pitch possessors performed better when the response time was longer.[143] This outcome of his research confirms the observations and notions of Quistorp and Haas that perfect pitch hearers tend to hear isolated pitches and therefore performed better when the response time was shorter. Relative pitch hearers, on the other hand, needed more time to analyse relationships and therefore performed better when the response time was longer.

All the previous references to perfect pitch were made by researchers and/or Aural Training teachers. Heino Schwarting, however, wrote an article on this theme from a perfect pitch possessor's point of view. He described the frustrations of absolute hearing (i.e. singing in a choir that rose or fell by a semitone during the course of a performance) up to the point where he started to lose this ability after a period of years. He eventually trained himself to hear relatively and recommended this type of hearing for other perfect pitch possessors.[144]

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140 Christoph Hempel, **Gehörbildung - Anleitung und Material für das gemeinsame Üben.** Zürich: Karl Heinrich Möseler, 1976 p. 11.

141 Monika Quistorp, **Die Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel, 1979 pp. 60-61.

142 Prof. Hubert Haas in an interview with the researcher on 7 November 1988.

143 John J. Barkowsky, "An Investigation into Pitch Identification Behavior of Absolute Pitch and Relative Pitch Subjects" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1688-A.

144 Heino Schwarting, "Vom absoluten zum relativen Gehör" in **Üben und Musizieren**, 6/2 (April 1989) pp. 68-72.

In order to force perfect pitch possessors to pay attention to inner tensions between tones, thus thinking relatively, Grabner recommended that they notate dictated examples in other keys than those in which they are played.[145] Quistorp suggested that relative and perfect pitch possessors should be placed in separate classes.[146]

From the above discussion it is clear that both relative and perfect pitch hearers should be included in the teaching of *all* Aural Training aspects.

Finally, regarding the target group of Aural Training, there are a few external circumstances that can have an influence on the success of a student's progress. Sprenger pointed out that the following factors played a role in the success of an Aural Training course: instruction hour, location of the classroom (outside disturbances), age of the student, size of the group, achievement differences within the group, ordering of groups according to their main instrument, student's willingness to cooperate, aptitude, student's personal listening experiences, current physiological and psychological condition of the student, student's knowledge about own weaknesses and strengths, student's achievement in comparison with classmates' achievements (either stimulated or hampered), the main instrument of the student (violinists often hear higher notes better than violoncello players) as well as the attitude of the teacher.[147]

4. METHODOLOGICAL APPROACHES[148]

> "Jeder Gehörbildungslehrer muß seine Lehrmethode selbst entwickeln und seinen Lehrstoff selbst aufbauen, weil ein umfassendes Standardwerk, an das er sich anlehnen könnte, fehlt."[149]

The nature of methodological approaches to Aural Training is well reflected in the above quotation. It is a perennial problem that *no comprehensive work* exists in which *all* methods of Aural Training appear without being biased towards at least one of these procedures. As a result of this, teaching practices tend to stagnate.

An overview of various Aural Training methods can revitalise this stagnation, not to serve as the final word on Aural Training, but to stimulate interest in adapting other methods or even develop new ones.

Against this background, the purpose of this section is to provide an overview of methods that were found in Aural Training literature and research ventures. However, it is an impossible task to write a complete ultimate instruction

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145 Hermann Grabner, **Neue Gehörübung.** Berlin: Max Hesses, 1962 p. 5.

146 Monika Quistorp, **Die Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel, 1979 p. 66.

147 Hermann Sprenger, **Methodik der Gehörbildung**. Unpublished manuscript, [n.d.] pp. 4-5.

148 No strict semantical differentiation was made between the terms *Methological approaches*, *Methods* and *Tasks*.

149 Roland Mackamul, **Lehrbuch der Gehörbildung, Band I.** Kassel: Bärenreiter, 1969 p. 7.
"Every Aural Training teacher has to develop his own teaching method and build up his own instruction material, because a complete standard work towards which he can orientate himself does not exist." (Reseacher's translation.)

manual which takes into account all the little teaching nuances, perspectives and varieties of pupils' personalities. The beauty of Aural Training is that there is no ultimate method in which the final word has been spoken. Instead, it can be a living subject presented in different creative ways.

All methods have their roots in a few basic assignments. Wilhelm Lehr distinguished between five different methodological procedures:

- Perception: perception of all appearances in the sphere of music and the sound world;
- Apperception: perception of all acoustical happenings and active processing (individual estimation);
- Repetition: repetition of what was perceived (verbally or in a written form);
- Nomination: to name and describe, using subject-related terminology;
- Production: creative acts in the form of completion tasks or students' own compositions.[150]

These methods described by Lehr, comply with the action fields described by Brühl (apperception, repetition, nomination, production)[151] and Fried Weisbrod (production, reproduction, transposition, reception, reflection)[152]. Weisbrod did not see these fields of action as closed fields, but rather as interrelated, interchangeable pivotal points within complex musical behaviour.

Gauldin described five basic hearing skills: Conversion of sound to symbol; Conversion of symbol to sound; Comparison of sound to symbol; Conversion of symbol to imagined sound; Immediate instrumental reproduction of a previous sound source.[153] Brink described seven aural tasks more explicitly:

- To reproduce in body motions what was heard
- To reproduce in sound what was heard
- To produce graphically what was heard
- To notate what was heard
- To verbalize what was heard
- To identify discrepancies between performance and score
- To sing from a score.[154]

Taking into account the abovementioned rudimentary methods, a list of methods is presented after which every method is discussed briefly. As was explained earlier, the sole goal of Section Four is to present an overview of methods, permitting only a sketchy report on the various methods. Also, although the different methods are described individually, combinations of them frequently appear in teaching practice.

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150 Wilhelm Lehr, "Gehörbildung, Gehörtraining, Hörerziehung" in **Neue Musikzeitung,** 34/5 (October/November 1986) p. 27.

151 Karl W. Brühl, **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978 p. 9.

152 Fried Weisbrod, "Methoden der Hörerziehung und der Gehörbildung" in Wolfgang Schmidt-Brunner (Ed.), **Methoden des Musikunterricths.** Mainz: Schott, 1982 p. 222.

153 Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory,** 18/1 (Spring 1974) p. 76.

154 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 76-96.

Two major distinctions are made between classroom-based and programmed instruction. Although most of the methods discussed under the heading of classroom-based instruction also form part of programmed instruction and vice versa, these two approaches were discussed separately because they represent different learning environments. They should, however, not be seen as opposites but simply as different manifestations of teaching which, in most cases, are meant to complement each other. To the researcher's knowledge, there is no teaching on the tertiary level which takes place merely through programmed instruction. At the majority of universities, programmed teaching is treated as a supplement of classroom-based instruction.

4.1 Classroom-based instruction

4.1.1 Gestural tasks
- *(a) Indication of pitch*
- *(b) Indication of rhythm and meter/beat*
- *(c) Indication of combined music parameters*

4.1.2 Reproduction tasks
- *(a) Vocal*
- *(b) Instrumental*

4.1.3 Recognition tasks
- *(a) Scales*
- *(b) Intervals*
- *(c) Chords*
- *(d) Clichés*
- *(e) Timbre*

4.1.4 Imagination tasks

4.1.5 Reading tasks
- *(a) Score reading*
- *(b) Rhythm reading*
- *(c) Sight singing*

4.1.6 Transcription tasks
- *(a) Traditional notation*
- *(b) Other stave systems*
- *(c) Non-traditional notation*

4.1.7 Transposition tasks

4.1.8 Completion tasks

4.1.9 Discrepancy tasks
- *(a) Aligning notation and sound*
- *(b) Error detection*
- *(c) Comparisons between score and different recordings*

4.1.10 Description tasks

4.1.11 Aural Analysis tasks

4.1.12 Creative tasks

4.1.13 Evaluation tasks

4.2 Programmed instruction

4.2.1 Non-computer-assisted programmed Aural Training (NCAT)

4.2.2 Computer-assisted Aural Training (CAT)

4.1 Classroom-based instruction

4.1.1 Gestural tasks

The history of gestural tasks can be traced back to 2723-2563 B.C. when Egyptian choir and orchestra leaders indicated the contour of the melody and a few rhythmical details using hand signs. This practice was called *cheironomy*. The purpose of these signs was to help musicians, who performed long works from memory, to remember difficult intervals. Alongside the *cheironomes*, other musicians helped from time to time to keep the beat and to indicate measures.[155]

Whereas the use of hand signs served the purpose of "live" music notation to aid the memory during Antiquity and Early Christian Times, later developments such as the Guidonian hand, John Curwen's Tonic solfa hand signs, Peter Koch's Nü-method, and Eurhythmics of Émile Jaques-Dalcroze evolved as an instruction aid to the development of musical understanding.

The rationale behind these methods is that tonal (and modal) relationships can be easily understood if they are supported by hand signs. Visual and physical motions support the development of inner hearing.[156] Jaques-Dalcroze aimed to develop the musical thinking of the student to the point where he could perform his own feelings and thoughts without merely copying those of others. The purpose of his teaching was to help students not to say "I know", but rather "I have experienced".[157]

A whole 1989 issue of **Musik und Bildung** (7/8) concentrated on the often neglected theme of music and movement. Christoph Richter stated that anthropological considerations on the corporeity of the human being will illuminate the relationship between bodily movement and music, and will reveal the importance of movement for experiencing and understanding music. It should therefore be one of the methods of Music Education (and thus of Aural Training) to acquire in order to study music through movement.[158]

> "The fundamental requirement is to transpose a level of comprehension gained by an aural and temporal process to a physical account of that comprehension in a spatial and temporal process. To demonstrate a level of structural awareness by physical gestures requires the ability to mentally reconstruct structural

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155 Hans Hickmann, "Handzeichen" in **Die Musik in Geschichte und Gegenwart**, 5 pp. 1443-1451.

156 Micheál Houlahan and Philip Tacka, "Sound Thinking: A Suggested Sequence for Teaching Musical Elements Based on the Philosophy of Zoltan Kodály for a College Music Theory Course" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 91 and 93.

157 Émile Jaques-Dalcroze, **Eurhythmics, Art and Education**. Ann Arbor, Michigan: University Microfilms International, 1979 pp. 50-51, 58. Original French publication in 1912.

158 Christoph Richter, "Einige Gedanken zum Verhältnis von Musik und Bewegung" in **Musik und Bildung**, 7/8 (1989) pp. 411 and 413.

elements and transpose them into the most elementary form of intelligent communication, that of physical motion."[159]

Three basic physical gestural tasks can be distinguished: tasks which merely involve pitch representation, tasks which merely involve rhythm and meter representation, and tasks involving a combination of pitch, rhythm, meter, articulation, texture and harmony.

(a) Indication of pitch

The indication of pitch by means of hand signs often takes place within sight singing classes. While students are singing from sight, accompanying hand signs for the sung tones are performed. Two different forms of pitch indication can be determined, namely relative (moveable doh) and absolute pitch (fixed doh) based hand signs. The relative pitch hand signs always occur in relation to different solmization practices which are discussed in section 4.1.5 (c), whereas the absolute pitch hand signs often occur in connection with the musical stave.

In the relative pitch domain the *Guidonian hand*, developed in the Middle Ages and associated with the hexachord system, is one of the milestones in the development of pitch-related hand signs. Although the Guidonian hand is attributed to Guido of Arezzo (995-1050?), its development supposedly took place after Guido's death. It is doubtful if the Guidonian hand was ever used in musical practice. There is also reason to believe that the use of hands for showing calendar computations, tetrachords and the position of semitones was known before the Guidonian hand.[160]

Although its use was not common practice, Rosemary Killam reported about one thousand years later on the incorporation of the Guidonian hand in her modal counterpoint classes based on sixteenth-century sacred music. She maintained that solmization and the Guidonian hand, amongst other things, assisted students in performance practices and provided insight into the solution of some of the problems of ficta.[161]

In this period of one thousand years, solmization practices and the accompanying hand signs underwent many changes. As it is not the aim of this chapter to describe fully *all* the different historical manifestations and nuances of Aural Training, only highlights will be lifted out. After Guido, solmization and hand signs developed into the hepta- and octochord. Some of these changes were improvements of Guido's system, whereas others made use of totally different syllables. Ramis de Pareja (1440-1491), for example, made use of the principle of the Guidonian hand in connection with the syllables *psal-li-tur per vo-ces is-tas*, which were arranged in different positions on the hand. Although Georg Lange, Dietrich Stoverock, Andrew Hughes, Edith Gerson-Kiwi, Hans Hickmann as well as Martin Ruhnke referred to many different developments of solmization systems in Europe between ca. 1200 and 1800, they did not mention whether these methods included hand signs or not.

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159 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 76.

160 Andrew Hughes and Edith Gerson-Kiwi, "Solmization" in **The New Grove Dictionary of Music and Musicians**, 17 pp. 459 and 463.

161 Rosemary Killam, "Solmization with the Guidonian Hand: A Historical Introduction to Modal Counterpoint" in **Journal of Music Theory Pedagogy**, 2/2 (Fall 1988) p. 266.

The next important phase of relative solmization can be seen in the *Tonic doh* method with its hand signs developed by Sarah Glover (1785-1867) and John Curwen (1816-1880). Through the years different solmization systems with their accompanying hand signs were developed or derived from Curwen's method. In 1897 Agnes Hundoegger adapted their system for his *Tonika-Do* method, in which each syllable had a different character (e.g. doh is firm and stable, soh is brighter and more lively).[162] Other examples are: *TO-major* of Hermann Jaedicke (1928), *Zoltan Kodály's* revised Curwen hand signs (1944), [163] *Josef Wentz's* adaptations of Curwen's tonic doh (1950)[164] and the *Ja-le* hand signs of Richard Münnich (1959).[165]

Parallel to the development of solmization in the eighteenth century, relative number systems were developed (see section 4.1.5 (c)). Johann Friedrich Wilhelm Thomascik (1790-1875), for example, combined the hand with the five lines and spaces of the stave. Modulations were treated in the same way as in other relative systems: the first line always indicating the new tonic. Students had to touch the fingers involved. Friedrich Fröbel (1782-1852) developed his "finger piano". The left hand represented the piano keys while the right hand "played" songs on it in which the pitches were represented by numbers.[166]

Absolute pitch indication by means of the fingers of the hand was introduced by, amongst others, Nina d' Aubigny von Engelbrunner in 1803. She associated the five fingers of the hand with the stave. Students were to point at their fingers when singing on note names, indicating the lines and spaces involved. Other persons who used variations of the "stave-hand" were: Johann August Günther Heinroth (1780-1846), Guillaume Louis Bocquillon (1782-1842) and Joseph Mainzer (1807-1851). Theodor Krause (1833-1910) introduced the "walking" note. With a paper note on a stick, students had to indicate on a stave which tones they were singing.[167] Finally, Peter Koch introduced the *Nü*-indications of semitones and whole tones in 1972.[168]

Beverly Ann Martin investigated the effectiveness of echoing melodic patterns using tonal syllables without visual aids, in comparison to echoing melodic patterns that employ hand signs, or both hand signs and tonal syllable names written on paper. Her target group was first-grade students in the United States of America. No method was found to be significantly better than the others. Martin, however, explained that the chosen tasks were far too difficult for

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162 Agnes Hundoegger, **Leitfaden der Tonika-Do-Lehre.** Berlin: Tonika-Do, 1925 p. 12.

163 Lois Choksy, **The Kodály Context: Creating an Environment for Musical Learning.** Englewood Cliffs, N.J.: Prentice-Hall, 1981 pp. 9-10.
No specific reference was made to the use of hand signs by Kodály in his writings. They first appeared in a book written by Jenö Adám at Kodály's request.

164 Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978 pp. 22, 32-25.

165 Richard Münnich, **Jale - Ein Beitrag zur Tonsilbenfrage und zur Schulmusikpropädeutik.** Wolfenbüttel: Möseler, 1959 pp. 17-23.

166 Hans Fischer (Ed.), **Handbuch der Musikerziehung.** Berlin: Rembrandt, 1954 pp. 51-52.

167 Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978 pp. 28-31.

168 Peter Koch, **blattlesen in der schule - die nü-methode.** Vienna: Universal Edition, 1972 p. 25.

first-grade students. It is therefore not possible to provide any statistical evidence in favour of/or against the use of hand signs.[169]

(b) Indication of rhythm and meter/beat

The indication of rhythm and meter by means of physical movement can take place by acting upon what was heard without the presence of notation, or can happen as the reaction to reading music notation. Music symbols are translated into physical gestures in the same way that symbols are translated into pitches and rhythms in other reading tasks. Although the second form of rhythm and meter indication also belongs to the rhythm reading category, it will be discussed in the gestural tasks category.

Roger Graybill defined rhythm as a flow of energy through time, often associated with physical movement. He distinguished between *attack point rhythm* and *gestural rhythm.* Attack-point rhythm is a succession of durations either abstracted from, or implying the presence of, discrete elements. Although gestural rhythm includes attack point rhythm, not only the measurement of discrete musical elements is involved, but also the continuous dynamic flow through these elements.[170]

Rhythms can thus, on the one hand, be translated into attack point physical movements without paying attention to the rhythmical (musical) context and structure. Examples of this approach can be seen in the Hundoegger hand signs for note values,[171] and in the Thomascik bodily representations of different beat divisions (e.g., eighth notes should be tapped with the right hand, quarter notes with the left hand, half notes should be marched with the feet, and whole notes should be indicated with the head.)[172]

Gestural rhythm on the other hand, implies the translation of rhythms into physical movements on a more holistic level, paying attention to the musical context. Graybill provided a theoretical foundation of gestural rhythm, taking into consideration the eurhythmic pedagogy of Jaques-Dalcroze and the rhythm theories of Benjamin as well as Lerdahl and Jackendoff. As this theoretical foundation is important for all forms of rhythmic training, including rhythm reading as discussed in section 4.1.5 (b), it is worthwhile to take a closer look at it.

In Graybill's theory two essential theoretical concepts are discussed, namely grouping principles and the difference between phenomenal and metrical accent.

Graybill defined a gesture as "any meaningful musical unit conceived as having continuity and dynamic shape." He pointed out that a gesture has much in common with the notion of a group. In the same way as elements or events are

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169 Beverly Ann Martin, **The Effect of Hand Signs, Verbal Tonal Syllables, and Letter Representations of Tonal Syllables on the Verbal and Symbolic Acquisition of Tonal Skills by First-Grade Students.** Doctoral dissertation, University of Oklahoma 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

170 Roger Graybill, "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 1-2.

171 Agnes Hundoegger, **Leitfaden der Tonika-Do-Lehre.** Berlin: Tonika-Do, 1925 p. 31.

172 Hans Fischer (Ed.), **Handbuch der Musikerziehung.** Berlin: Rembrandt, 1954 p. 51.

"chunked" into groups, the boundaries of any particular gesture of two or more notes will also mark the boundaries of a group. He continued that a gesture is, however, more than just a musical segment also but has by definition a dynamic shape. This basically is an intensity outline emanating from any musical element (or combination of elements) that is able to produce varying degrees of intensity, such as dynamics, timbre, articulation, pitch contour or durational pattern. Quoting Lerdahl and Jackendoff, Graybill demonstrated, for example, that a relatively long note in an immediate context will tend to be the last of a group. He also illustrated how pitch contour (direction of the line and interval size) can influence dynamic shape (intensity).

Referring to the fact that the dynamic shape of any gesture leads to, and/or comes from a primary point of accent, Graybill described a phenomenal accent as any audible musical event that emphasises a moment in musical flow. It is a point of focus that helps to shape the continuity. The metrical accent in which the beat plays the important role is, on the contrary, not always an audible event and it can be overruled by the phenomenal accent. The listener is able to construct a metrical hierarchy if just enough information is provided, even though phenomenal accents may occasionally fail to reinforce it. The following example demonstrates how the contour fails to reinforce the fourth beat:

Fig. 2.4 Graybill: Example of how contour fails to reinforce the fourth beat

Finally Graybill discussed several levels of gestures which he called gestural hierarchy. He pointed out that any passage of music will contain gestural shapes at several levels, and that a convincing performance of such a passage depends on balancing the various levels to the extent of giving each unit its proper meaning within the overall hierarchy. An example of such a hierarchy appears in the following phrase:

Fig. 2.5 Graybill: Example of gestural hierarchy

According to Graybill, it is possible to start with purely durational exercises where other parameters are absent, because rhythmic patterns which contain durational differences and/or rests will imply groupings, as well as a defined gestural contour. He, however, saw this only as an introductory level after which pitch, dynamic level, phrasing and articulation should be included.

In the first stage of rhythmic training, students should start with conducting simple meter because metrical structure can be shown in a gestural way. Graybill referred to the Jaques-Dalcroze classification of beats as crusis (release of energy), metacrusis (gentle carryover of energy or a dying away) and anacrusis (preparation of energy for release). Conducting patterns can illustrate these different beat qualities effectively:

> "The arm shows the anacrusis with an upward thrust. Since this motion traces a trajectory against gravity, it represents a building-up of potential energy that awaits release. Such release is provided by the subsequent dropping of the arm for the crusis, which should feel like an inevitable consequence of the

anacrusic preparation. Since the falling of the arm is assisted by gravity, we associate the bottom of that fall - i.e. the ictus - with a feeling of weight. The following metacrusis beat(s) feel relatively neutral in comparison to the anacrusis and crusis, though the outward thrust of beat three in four-four (or beat two in three-four) feels like a preparation for the lift of the forthcoming anacrusis. In this respect, the metacrusis is not merely a dying away as suggested by Dalcroze, but also a gathering of energy."[173]

He recommended the walking of meter for students who have problems with conducting. When students are able to accomplish this, they should learn to conduct different kinds of musical character (e.g. staccato, marcato, intense legato, a more floating legato) in response to music played for them, because it enables them to examine the expressive possibilities of physical gesture.

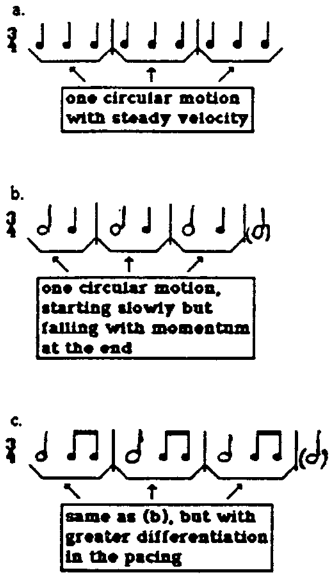
During the next stage of rhythmical training work in gestural grouping can start. Graybill wrote a pilot text containing thirteen units for a freshman theory course at the University of Texas, Austin. Each of the thirteen units focused on a particular duration unit or a rhythmic topic. Each unit was subdivided into three parts: short formulaic patterns, longer durational exercises in which the formulaic patterns were placed within a larger context and, finally, actual melodies to investigate the effect of pitch structure, dynamic markings and articulation on gestural shape.

In order to help students to understand and experience gestural grouping, physical gestures can be introduced at this point. Graybill distinguished three basic categories of physical gestures in which movement takes place within the rhythm reading realm. In the first category each note of the pattern is given its own individual subgesture, while including these subgestures within a larger gestural progression. This can be done through clapping, or walking a rhythm with alternating feet. He recommended that the student step forward on a downbeat (unless a rest appears on that point) and step the other notes of the measure in place directly under the torso. Rests should not be stepped but may be indicated with a snap of the fingers.

The second category showed the gestural shape of the group as a whole without performing the individual notes with subgestures. Patterns in triple meter can, for example, be illustrated with a large circular motion of the arm, with a new circle beginning at the start of every new measure. If no string grouping (e.g. as in a succession of equal note values) appears, this non-grouping is shown by the arm moving through the circle with a constant speed. If grouping arises through durational differences, the arm should change speed within each circular motion. Examples of non-grouping and grouping are as follows:

[173] Roger Graybill, "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) p. 18.

Fig. 2.6 Graybill: Example of non-grouping and grouping gestures



Pendulum movements can be used for portraying dotted rhythms. For any value longer than a beat the technique of clapping the attack and then slowly pulling the hands apart as if pulling against a resistance should be used to show the full duration.

In the third category of physical gesture a specific level of the metrical hierarchy, for instance the beat or some subdivision of the beat, was shown. Against this repeated motion, the actual rhythm is spoken or portrayed by another part of the body. The student might, for example, sway from side to side with bent knees to show the dotted quarter pulse, while intoning a durational pattern in compound meter.[174]

(c) Indication of combined music parameters

The combination of music parameters expressed through body movements can best be illustrated by Jaques-Dalcroze's method which contains three interrelated subjects: Aural Training, Improvisation and Eurhythmics.

At first students simply have to walk to improvised music, following the different tempi and shadings. These basic movements gradually develop to include all elements of music: note-values, measures, rhythmic patterns, phrases, polyrhythms, group work and conducting, improvisation. Students have to invent rhythms to perform them physically, melodically, to change, to develop, to write and read them. Learning and creating processes constantly interact. The interpretation of compositions through spontaneously improvised movement, portraying different musical elements, forms an advanced level of Eurhythmics.[175] Irwin Spector reported that Jaques-Dalcroze once assigned Beethoven's *Eighth Symphony* for study. Each student had to learn an instrumental part from memory and learn to sing it. The score was then assembled in class and the symphony performed by singing. He later used the

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174 Roger Graybill, "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 4-33.

175 Henrietta Rosenstrauch, **Essays on Rhythm Music Movement**. Pittsburgh: Volkwein, [n.d.] p. 9-11.

same idea with body movement, each instrumental part being performed bodily instead of being sung.[176]

4.1.2 Reproduction tasks

This method is one of the oldest forms of teaching music. Before the development of music notation, musicians learned their music parts by rote. It is important to note that there is a difference between imitation and reproduction. It is possible to repeat a sentence in a foreign language without being aware of its meaning. In the same way it is possible to imitate vocally what was heard without understanding the musical structure. But when a musical phrase is reproduced, the ability to reconstruct (analyse) structural elements mentally and perform them vocally or instrumentally is required. Reproduction of what was heard should include exact pitch, rhythm, dynamics and even timbre in the case of a simple melody. In the case of a more complex melody, general traits should be reproduced.[177] Reproduction tasks are a prerequisite for creative tasks.

Although the principle of reproduction is as old as music itself, the incorporation of it into Aural Training classes has often been neglected in the twentieth century.

(a) Vocal

Apart from the vocal reproduction in the same register as played, Güldenstein suggested that students vocally repeat two to five tones played in different octave registers within the range of one octave.[178] Thackray also recommended the closest possible pitch and duration reproduction of 'sounds of everyday life' such as car horns, bird calls, bells, etc.[179]

(b) Instrumental

Instrumental reproduction of what was heard can take place on every instrument, and is also referred to as 'playing by ear.' Michael David Wilder called this skill 'ear-to-hand coordination', and defined it as the skill employed to transfer what is heard, imagined, or recalled to a musical performance without the use of music notation.[180]

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176 Irwin Spector, **Rhythm and Life - The work of Émile Jaques-Dalcroze.** Stuyvesant, NY: Pendragon, 1990 p. 95.

177 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 79-80.

178 Gustav Güldenstein, **Gehörbildung für Musiker - Ein Lehrbuch.** Basel: Schwabe, 1971 p. 28.

179 Rupert Thackray, "Some Thoughts on Aural Training" in **The Australian Journal of Music Education,** October 1975 p. 28.

180 Michael David Wilder, **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral Dissertation, University of Michigan 1988. Ann Arbor, Michigan: University Microfilms International, 1988 p. 12.

Instrumental reproduction develops the ability to recognise tonal-rhythmical patterns before reproducing them. It is an aid to the ramification of inner hearing, and an essential skill for developing above the level of the repertoire restricted performer. Without ear-to-hand co-ordination, performances tend to be a sophisticated form of typing.[181] It is also a way of demonstrating aural comprehension.

Although the details of instrumental reproduction are dependent on the musical material that is used, Per-Gunnar Alldahl described a few basic principles of this method of which anything can be the basis for reproduction: rhythm, melody, harmony, phrasing, etc. He recommended that the reproduction should be taught as a continuous musical dialogue between teacher and student. The teacher first plays a phrase, after which the student immediately repeats it in the same tempo and pulse. Apart from other instructors such as Hubert Haas who recommended a verbal analysis of problem areas,[182] Alldahl suggested that not a word should be uttered until the student gives the 'correct' response. According to him too much psychological energy would be wasted by stopping. The teacher should rather break down the 'goal phrase' into sufficiently simple components so that the student never gives the wrong 'answer'. He, however, warned against playing mechanically the first two notes, then the first three, and so forth. The musical material should be restructured in small but significant musical entities in manageable portions. 'Corrections' are made by more simplified repetitions. Care should be taken that the student's answer is rhythmically well articulated. The following example was used to demonstrate these principles:[183]

Fig. 2.7 Alldahl: Example of a reproduction task

Musical phrase to be reproduced:

Bach, Trio Sonata III

Reconstruction of material:

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181 James O. Froseth as quoted by Michael David Wilder, **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral Dissertation, University of Michigan 1988. Ann Arbor, Michigan: University Microfilms International, 1988 p. 4.

182 Observations by the researcher of the teaching of Prof. Hubert Haas at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart*. He also mentioned in an interview (18 January 1989) that it is important that the student does not play until he knows what to play. The purpose of playing-by-ear is to indicate the extent to which the musical example was structurally comprehended. If a student risks playing before analyzing (often in a verbal form) the musical structure, and it is wrong, this wrongly played phrase distorts the correct phrase that was saved in the short-term memory.

183 Per-Gunnar Alldahl, "Teaching Music Theory: The European Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 119-121.

Several authors have objected to the fact that little attention is given to this important technique. Thomas Walker Brown maintained that this skill is considered by many to be a purely "bestowed" skill and unamenable to training. He designed and evaluated a one-semester undergraduate course in aural skills development which incorporated playing by ear as well as traditional approaches. Many instructional activities proved to be effective, but the students found playing songs by ear the most meaningful and enjoyable course experience.[184] These results correspond with students' attitudes as investigated by James O' Froseth. Ninety-one percent indicated that instrumental reproduction instruction improved the recognition of intervals, 63% indicated the improvement of dictation skills, and 60% indicated an increase in improvisation skills.[185] A significant relationship between Sight reading and Playing by ear was found by John R. Luce. He recommended that methods for teaching playing by ear should be devised, spending as much time in teaching it as in Sight reading.[186]

Michael David Wilder investigated the relationships between ear-to-hand co-ordination and written and aural music theory skills amongst first-year students. His conclusions were that melodic ear-to-hand co-ordination

(a) is highly correlated with aural music theory skills;
(b) is an effective predictor of success in introductory freshman aural music theory classes;
(c) can be improved through practice and training;
(d) skills are effectively retained over time;
(e) retention is greater for aural music theory skills than for written music theory skills as measured by a final written music theory examination.[187]

4.1.3 Recognition tasks

The ability to recognise elements and small structures by *labelling* forms the lowest level of cognitive thinking according to Bloom et al. and Cawood et al.[188] Aural recognition tasks are passive in their nature, because musical elements and structures have to be labelled as opposed to gestural, reading, reproduction, completion and production tasks, which involve some kind of action such as clapping, singing, etc. Recognition tasks are often combined with active tasks, for example, not only to recognise certain intervals but to also sing them. Because of the intertwined nature of all Aural Training methods, it often is the case that the ability to recognise musical elements or musical

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184 Thomas Walker Brown, "An Investigation of the Effectiveness of a Piano Course in Playing by Ear and Aural Skills Development for College Students" in **Dissertation Abstracts International**, 51/12 (June 1991) pp. 4052-A - 4053-A.

185 James O. Froseth as quoted by Michael David Wilder, **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral Dissertation, University of Michigan 1988. Ann Arbor, Michigan: University Microfilms International, 1988 p. 5.

186 John R. Luce, "Sight-Reading and Ear-Playing Abilities as Related to Instrumental Music Students" in **Journal of Research in Music Education**, 13/2 (Summer 1965) p. 108.

187 Michael David Wilder, **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral Dissertation, University of Michigan 1988. Ann Arbor, Michigan: University Microfilms International, 1988 p. 124.

188 Krathwohl, Bloom and Masia, **Taxonomy of Educational Objectives - The Classification of Education Goals, Handbook II.** New York: David McKay, 1964 pp. 186-193.
J. Cawood, F.B. Muller and J.F.A. Swartz, **Grondbeginsels van die didaktiek.** Goodwood: National Educational Press, 1982 p. 58.

structures depends on singing/clapping/producing them.[189]

(a) Scales

Kühn stated that the inclusion of scales in the Aural Training syllabus serves the purpose of developing intonation skills and inner hearing.[190] Apart from naming different scales and modi when heard, "hidden" scale movements can also be recognised in played melodies. The recognition of different scales can furthermore be combined with prepared notation in which the student has to add the correct key signatures/accidentals.[191] According to Kühn, the labelling process can be reversed in that students create their own scales and then play/sing them. Thackray suggested the collection of different percussion instruments and arranging them firstly, in order of ascending pitch and secondly, in order of increasing resonance. He furthermore encouraged the tuning of eight glasses to a scale in for example the Dorian mode by adding the right amount of water to each of them.[192]

(b) Intervals

The study of melodic and harmonic intervals can be treated within a musical context or isolated from it. In both approaches, the order of intervals to be recognised (interval size) can be either predetermined or randomly selected.

The predetermined ordering of intervals, starting first with diatonic intervals from the major scale in the systematic order of seconds, thirds, fourths, etc., is a popular practice in a variety of Aural Training books.[193] In some texts chains of intervals are built (e.g. seconds, fourths) which have to be recognised as well as sung. Often other methods such as notation and sight singing will also concentrate on a particular interval alongside the recognition of this interval.[194] Interval knowledge can be applied to create melodies consisting mainly of seconds, fourths, etc. A second voice can be improvised, consisting mainly of thirds or sixths.

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189 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 p. 61.

190 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 pp. 26-28.

191 Hermann Sprenger, **Methodik der Gehörbildung**. Unpublished manuscript, [n.d.] p. 24.

192 Rupert Thackray, "Some Thoughts on Aural Training" in **The Australian Journal of Music Education,** October 1975 p. 28.

193 M.E. van Ebbenhorst Tengbergen and L.S. Maaré, **Solfèges.** Amsterdam: Broekmans and Van Poppel, [n.d.].
Leo Horacek and Gerald Lefkoff, **Programed Ear Training, Vol. I.** New York: Harcourt, Brace and World, 1970.
Some authors saw the study of intervals as a way to deal with both tonal and atonal music. Ronald Herder is an example of this school of thinking. He treated intervals within the context of a tonal melody and gradually transformed it by means of chromatic alterations into an atonal melody. Although Herder described tonality "as tending to gravitate toward a central point, tending to seek a focal point or 'home' tone where energies come to rest, thus pointing to inner relationships," he based his method on the recognition of different intervals, starting with the smallest diatonic interval, the minor second. This progressively works towards the octave.
Ronald Herder, **Tonal/Atonal progressive Ear Training, Singing and Dictation Studies in Diatonic, Chromatic, and Atonal Music.** New York: Continuo Music Press, 1973 pp. v and xvii.

194 Roland Mackamul, **Lehrbuch der Gehörbildung - Band 1, Elementare Gehörbildung.** Kassel: Bärenreiter, 1969 pp. 31-35.

Another approach to the systematic teaching of intervals is to determine different levels of interval acquisition. Quistorp first grouped the perfect intervals (I, IV, V and VIII) together, then major and minor II, III VI and VII, followed by a third group of chromatic and enharmonic intervals.[195] Blombach and Parrish referred to the six levels of difficulty as formulated by Spohn and Poland:

Level I M2, P4, M7, P8
Level II m2, M3, TT (Tritone), M6
Level III m3, P5, m6, m7
Level IV m2, M2, P4, M7, P8
Level V m3, TT, P5, M6, m7
Level VI m2, M2, m3, M3, P4, TT, P5, m6, M6, m7 M7, P8 (all intervals)[196]

Both Blombach et al. and Spohn et al. found the tritone, minor sixth and minor seventh to be the most difficult intervals to recognise, and provided tables of "confused" intervals, in which the "confusions" between intervals appeared as percentages. Examples of general mistakes that appeared were furthermore described by Sprenger: the highest and lowest tones are inverted, thus hearing the complementary interval; completion of the interval by the ear to a triad, hearing this imagined tone as part of the interval with the result of wrongly recognizing e-g as a major third in the context of a C major triad.

He also recommended the development of attaching characteristic attributes to intervals. Although words cannot fully describe intervals, he gave a few examples such as: Perfect prime: basis, content, balance; minor second - filled with tension, leans towards the prime; perfect fourth: clear, pushing against a border; etc.[197]

The often used method of developing interval acquisition with the aid of the beginning intervals of songs or other musical works was sharply criticised by Kühn. Although it can be helpful for the recognition of isolated intervals, this procedure is not applicable to intervals within a musical context.

The influence of the musical context on interval recognition was described by Allen R. Trubitt and Robert S. Hines as "the illusion of expanding and contracting distance between intervals in certain melodic sequences." When, for instance, recognizing or singing whole tones within a whole tone scale, there is the illusion that the further one moves away from the first two whole tones, the wider apart the pitches become.[198] As a way of developing tonal contextual thinking, several authors recommended the teaching of intervals with their "solutions". Although the interval is presented in an isolated form, students are taught to mentally imagine the next interval to which the first one leads, as if in a mini-musical context. Grabner, Kühn, Güldenstein and Illman are all examples of authors who

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195 Monika Quistorp, **Die Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel, 1979 p. 22.

196 Spohn and Poland as quoted by Ann K. Blombach and Regena T. Parrish, "Acquiring Aural Interval Identification Skills: Random vs Ordered Grouping" in **Journal of Music Theory Pedagogy,** 2/1 (Spring 1988) p. 116.

197 Hermann Sprenger, **Methodik der Gehörbildung**. Unpublished manuscript, [n.d.] pp. 17 and 21.

198 Allen R. Trubitt and Robert S. Hines, **Ear Training and Sight-Singing: An Integrated Approach, Book I.** New York: Schirmer Books, 1979 pp. 31-32.

made use of this method.[199] Another form of interval thinking within a tonal context can be seen in the punctual recognition of intervals in relation to the tonic. A row of approximately ten pitches is played and the student has to name these pitches by always mentally comparing them with the tonic.[200]

Grabner further recommended a broader interval recognition within a musical context as a form of concentration exercise. A musical motive is played after which a melody in which the motive appears is played. The student has to indicate when the motive appears either unchanged, or as a sequence, or in a changed form (e.g. inversion). Another assignment can be to recognise all fifths, tritones etc. in the played melody. Kraft advised recognizing the highest and lowest pitches within a musical phrase.[201]

The use of "dyads" (a harmonic unit consisting of two tones) as the twentieth century answer to diatonic intervals in tonal music was presented by Friedmann. In this complex system intervals are freed from tonal associations such as consonant and dissonant in that clinical numerical names for pitches, pitch classes and the various types of interval are used. Whereas, for example, the major second in tonal music is associated with tension and dissonance, the same interval in atonal music can have a different character which is articulated through the context of rhythm, timbre and contour particular to a given composition. Recognition tasks of dyads can, for example, be to identify the "ip mod 12(n), i(n) and ip(n)" after a two-pitch dyad is heard. Friedmann advised students to work simultaneously on a "calisthenic" level while acquainting themselves with this highly structured approach to Aural Training. A calisthenic exercise would be, after hearing a melody several times, to attempt to sing all pairs of pitches separated by a whole-step or less, and to sing them before and after singing the whole melody.[202]

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199 Hermann Grabner, **Neue Gehörübung.** Berlin: Max Hesses, 1962 pp. 15 and 31.
Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 pp. 24-25.
Gustav Güldenstein, **Gehörbildung für Musiker - Ein Lehrbuch.** Basel: Schwabe, 1971 p. 160.
Michael Illman, **Systematic Aural Training - Teacher's book.** London: Longman, 1974 p. 67.

200 The researcher observed this method as used by Ursula Flinspach at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart.*

201 Leo Kraft, **A New Approach to Ear Training - A Programed Course in Melodic Dictation.** New York: W.W. Norton, 1967 Unit one, Lesson AA.

202 Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990 pp. 4-22.
Definitions: *Pitch*, p. 9: "A pitch is the specific fundamental defined on the staff, as played by instrumentalists and sung by singers. A pitch name yields no information about timbre, dynamics, duration, function, or inflection. It does however define the approximate frequency of a fundamental tone, and therefore its octave placement. If we assign numbers to pitches, middle C (below the treble clef and above the bass clef) can be called 0. Pitches above middle C are given positive numerical values (+n) and pitches below middle C negative values (-n) according to their distance in half-steps from middle C."
Pitch class, p. 13: "Pitch class is a numerical name for a category of *pitches* ... with the same sound, separated by twelve semitones, or separated by any multiple of twelve semitones. There are twelve possible pitch classes, numbered from 0 to 11. Two possible numbering systems can be useful: one where C is called 0, the other where a pitch central to a given piece is 0."

(c) Chords

In this category various types of triads, seventh chords, trichords and other twentieth-century chord models can be recognised aurally. Whereas triads and seventh chords normally operate within the tonal sphere, the latter two represent the atonal domain. As with intervals, the study of chords can take place within or isolated from the musical context.

The treatment of triads and seventh chords isolated from the musical context can be seen in the following example. A single tone is played and named. A chord is played, based on this tone, and the student has to name the chord. Another form of this method is to sing the chord, or play it on a keyboard instrument.[203] The principle of chaining chords was demonstrated by Kühn:[204]

Fig. 2.8 Kühn: Example of the principle of chaining chords

Recognitions of the inversions of triads and dominant seventh chords that can all be built on one central tone, was also demonstrated by Kühn as a way of preparing students to recognise modulations in examples from the music literature:

Fig. 2.9 Kühn: Example of preparatory modulation exercises

This exercise of Kühn can be compared with the "encounter" exercises devised by Paul Loeb van Zuilenburg. In these all the different dominant seventh chords (also taking into account inversions) that can be built on the note C, followed by their solutions, should be recognised or sung. E.g.: C-E-G-Bb/A-F-F-C; C-Eb-Gb-Ab/Ab-F-Db-Db; etc.[205]

As a way of preparing for the recognition of functional hearing (recognition of chords and their functions within a musical context), the incorporation of keyboard harmony into Aural Training plays an important role. Stanley Shumway, for example, addressed six areas in his keyboard harmony teaching method, namely typical settings,

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203 Christoph Hempel, **Gehörbildung - Anleitung und Material für das gemeinsame Üben.** Zürich: Karl Heinrich Möseler, 1976 p. 17.

204 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 pp. 29-30.

205 Paul Loeb van Zuilenburg, **Gehoortoetse en Gehooropleiding - 'n Inleiding.** Stellenbosch: Cabo, [n.d.] p. 24.

phrases with figured bass, melody harmonizations, melody improvisation, accompaniment patterns, as well as melody and accompaniment.[206]

Theodore Alexander Haendschke observed the following general mistakes that occurred in functional hearing: a II^6 chord in a major key was often mistaken for a IV. A major triad instead of a minor triad was heard, simply because the lowest note of the II^6 chord was the fourth scale step. Another error of this kind occurred in that a V6/5 was mistaken for a VII^7, thus identifying a major-minor seventh as a diminished seventh. Other errors were the misinterpretation of a II^7 as a II, and of a V^7 as a V. Haendschke used these examples of frequent errors as an argument for developing a concentrated course in the recognition of various types of chords. He discussed fifteen types of chords within the context of examples from the music literature (Bach to Debussy).[207]

Regarding atonal music, several attempts have been made to define paradigm structures. Lars Edlund treated different combinations of intervals within the musical context of the melody. He identified certain melodic patterns typical to the music from the first half of the twentieth century, and presented various chord combinations at the end of each chapter.[208]

Haas and Karkoschka criticised the approach often used in traditional Aural Training to teach atonal music from an interval approach, ignoring the perception of complex dissonant sounds as a whole. They emphasised general sound qualities (the estimated distance between tones - does the middle tone appear nearer to the upper or lower tone?), the number of tones within a "chord"/cluster and the general sound tension, as well as the identification of typical twentieth-century sounds such as clusters or chords consisting merely of fourths.[209]

The theory of pitch and pitch classes as the twentieth-century equivalent for tonal music has also infiltrated the teaching of Aural Training, as was explained under the previous heading. Based on the same principles as dyads, trichords (any set of three pitch classes, ordered or unordered) are used as the complement of triads. In this new perspective on interval structure, intervals are musical 'spaces' that may be partitioned in a variety of ways. Whereas tonal intervals are constructed by means of the diatonic step, atonal intervals are presented according to the semitones involved. There are twelve distinct trichord types. Each trichord type represents a set of four to twenty-four trichords to which it is related by transposition and inversion. Inversions in this case implies that two structures are mirror

206 Stanley Shumway, **Harmony and Ear Training at the Keyboard.** Dubuque, Iowa: Wm.C. Brown, 1976.

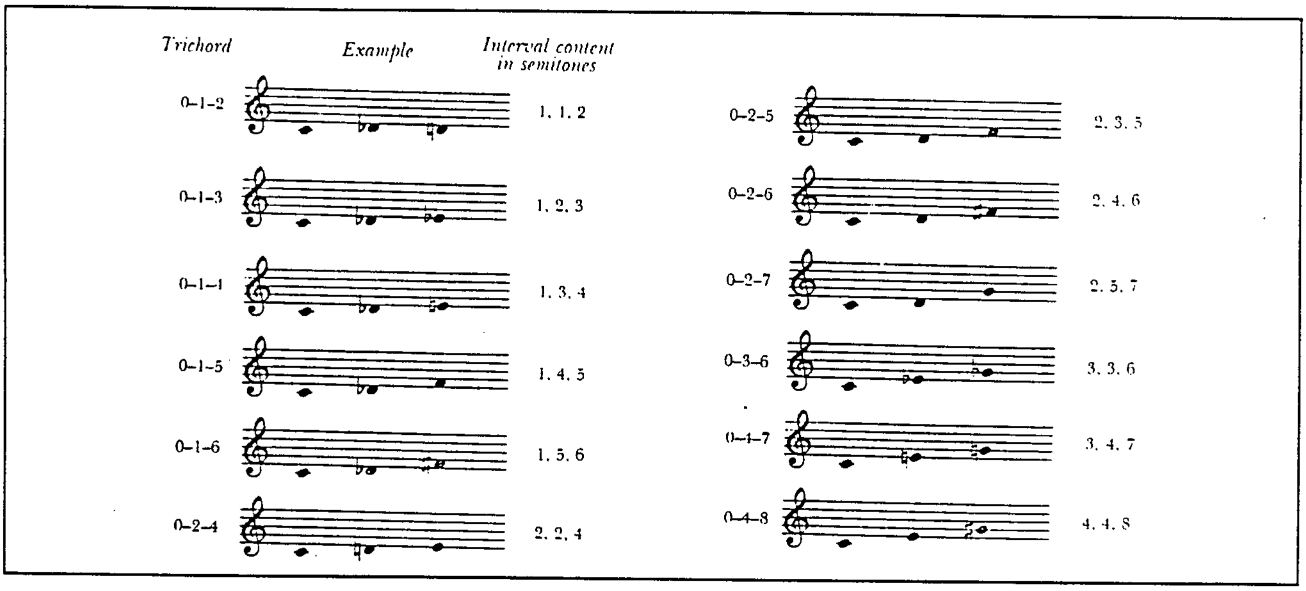
207 Theodore Alexander Haendschke, **The aural recognition of sonorities.** Unpublished Master's thesis, University of Texas, 1955 pp. 5-10.

208 Lars Edlund, **Modus Novus - Studies in Reading Atonal Melodies.** London: J. and W. Chester, 1963.

209 Hubert Haas and Erhard Karkoschka, **neue musik hören - Eine Hörerziehung mit neuer Musik in Theorie und Praxis.** Rohrdorf: Rohrdorf, 1981 p. 10.

images of each other. In the following Table, the prime form (in both pitch class integers and staff notation) as well as the interval content in semitones are presented:[210]

Table 2.2 The twelve trichords



Aural work with trichords involves the recognition of "Rip<( )>" and set class, both as melodic successions as well as simultaneities. Other methods involve the vocal completion of trichords when two tones are given, listening exercises on symmetry, improvisation exercises, etc.[211] Apart from trichords, tetrachords, pentachords and hexachords also form part of the pitch class theory.

(d) Clichés

Clichés refer to certain patterns/models that occur frequently in all the different musical parameters and style periods. By learning to recognise these models aurally and visually, a certain level of musical comprehension can be reached which can aid sight reading. For example, Loeb van Zuilenburg referred to stereotype rhythmic figures e.g. word and dance rhythms such as the Sarabande, Gigue, Siciliano, Mazurka, Polonaise and Sequidilles.[212]

All the different scales and cadences, as well as characteristic melodic patterns, instrumentation, harmonies, etc. that are related to the recognition of different style periods are also forms of cliché recognition. Referring to music from the twentieth century, Siegfried Borris pointed out that various sound models and types can be recognised in relation

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210 Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 pp. 270-276.
Steven E. Gilbert, "An Introduction to Trichordal Analysis" in **Journal of Music Theory**, 18/2 (Fall 1974) pp. 338-341.

211 Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990 pp. 50-71.

212 Paul Loeb van Zuilenburg, **Gehoortoetse en Gehooropleiding - 'n Inleiding.** Stellenbosch: Cabo, [n.d.] pp. 3-4.

to their historical development and different schools of thinking.[213]

(e) Timbre

The recognition of timbre ranges from the wholly obvious qualities such as differentiating between instruments, the subtler difference between, for example, the lowest and highest strings of a violin, and most subtle of all, the timbral varieties that a player can present when playing a single note. Pratt et al. suggested several ways of practising timbral recognition and notation by, for example, comparing different performances of the same work. In another exercise an orchestral player should play a single note and the rest of the class should discuss what they have heard regarding the vigour and immediacy of the opening attack, the thickness and constituent harmonics of the sound, whether the instrument is muted, and so forth.[214]

4.1.4 Imagination tasks

The sole goal of imagination tasks is to develop inner hearing which applies to all aspects of music. Developing this skill can take place with or without notation.

Imagination without notation takes place when a known melody can be "heard" mentally without seeing the notation or actually hearing it. Another form of imagination without the presence of notation can be seen in students being able to sing a requested interval when only the first pitch is given.

Referring to imagination tasks which involve notation as "anticipational hearing" and "fusing", Trubitt and Hines developed a few exercises for fostering these skills. Although occurring within the non-computer-assisted programmed environment, they can easily be adapted for classroom-based instruction. The student has to look at a short rhythmical phrase. The first bar is heard on tape, followed by one bar of silence. During this silence the student should try to mentally imagine (anticipate) the next bar in tempo. This is followed by playing the anticipated bar for control purposes. The whole procedure is repeated until the whole rhythmical phrase is imagined. Trubitt and Hines recommended the same procedure for the mental hearing of intervals. However, during the silent bar students should also sing the tone involved.

Regarding the inner hearing of harmonies, they developed a technique called "fusing" which is best described by the following example:[215]

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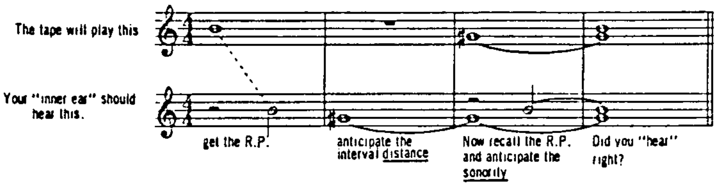
213 Siegfried Borris, "Klangbilder und Hörmodelle der neuen Musik" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962 p. 72.

214 George Pratt, Michael Henson and Simon Cargill, **Aural Awareness - Principles and Practice.** Milton Keynes: Open University Press, 1990 pp. 56-65.

215 Allen R. Trubitt and Robert S. Hines, **Ear Training and Sight-Singing: An Integrated Approach, Book I.** New York: Schirmer Books, 1979 pp. 11, 19, 30.

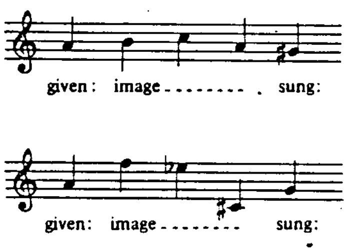
Fig. 2.10 Trubitt and Hines: Example of a "fusing" exercise



(R.P: reference pitch)

Also in the same category of pitch imagination, Pratt et al. presented the following exercise:

Fig. 2.11 Pratt et al.: Example of pitch imagination tasks



Furthermore, they developed "judging speed" exercises and maintained that although the choice of speed may vary, it is valuable to be able to judge it and relate it accurately to a standard way of notation in MM (Maezel's Metronome) numbers. They presented two ways of estimating MM speeds. One is by saying briskly but without "gabbling" 'Kodak-1, Kodak-2, Kodak-3' etc. which approximately equals a half note = 60, quarter note = 120 and eight note = 240. (Kodak-1 =) Another verbalization divides one second into three: one thou-sand, two thou-sand, thus equalling a quarter note = 180. (One thou-sand =)

This skill can be practised as follows: (a) Choose an MM number, clap it, measure the accuracy against a metronome; (b) someone else sets the metronome - judge the MM number; (c) instrumentalist plays a short passage from the music repertoire. Discuss a suitable MM number for it. Experiment with different tempi and discuss their effects on the performance; (d) compare strict in-time metronome playing with exaggerated rubato playing. Discuss the musical effects.

Pratt et al. also recommended the silent reading through of a simple extract of a score which is also available on record. (E.g. 'Niobe No. 3 from *Six Metamorphoses after Ovid* for solo oboe by Benjamin Britten.) The student should try to mentally anticipate the tempo, meter and rhythms while paying attention to the subtleties of rhythmic flexibility expected from a performer to add to the relatively inflexible notation. Other elements should be taken into account only when they influence the rhythmic flow. Expectations can be discussed with other students and be marked into the score. The anticipations should finally be compared with the actual recording. If they were not realised, the student may wish to comment, both favourably and otherwise, on the performance.

Another exercise on an even higher level of imagination can be to study excerpts from a score silently, paying attention to all the parameters of music. After doing so with for example the 'Prologue' from the *Serenade for Tenor, Horn and Strings* by Benjamin Britten, the following questions may arise:

"1. Did you hear a horn?
2. If so, who was playing it? Did you mentally hear the velvet smoothness and almost legendary accuracy of Dennis Brian for whom the part was written in 1943? Or was it a rough-toned amateur performance?
3. How close or distant was the imagined performer?
4. Did you find a close approximation to 'Andante (crotchet = 80)', and, within that, how far was the metre of your imagined performance *sempre ad libitum*?
5. Where exactly did the metrical pulse bend and flex?
6. How loud was the first note?
7. How firmly was it tongued?
8. Was the sustained third note coloured with a vibrato?
9. If so, how wide and fast was it?
10. How long was the first comma at the end of bar 1?
11. How smooth were the slurred intervals from bar 2 onwards?

... and so on - the range of questions is almost endless."[216]

4.1.5 Reading tasks

All reading tasks depend not only on the ability to imagine sound, but also enhance this ability. Whereas imagination tasks in most cases imply a form of silent reading, sound is always present in score reading, rhythm reading and sight singing. Score reading presents a passive form of reading which in effect is nothing else but a combination of recognition, imagination and reading tasks. The other forms of reading are, on the contrary, active in that students have to respond to what was read by producing sound. An abstract symbol has to be transposed into particular rhythm and pitch concepts stored in the long-term memory, that must in turn be realised vocally, instrumentally or gesturally.[217]

(a) Score reading

As score reading depends on the ability to connect sound with notation, McLoud McGaughey designed preparatory exercises for this skill called "selective listening". The ability to identify and locate a specific rhythmic pattern or sonority in a musical context is cultivated. Not only the ability to recognise the sought element is involved, but also the ability to follow the forward motion of the musical sounds in order to locate the element. The procedure of selective listening involves prepared rosters in which the exact number or bars and beats of the musical phrase appear. While the phrase is played, the student has to move his pencil across the roster in time, placing a check mark on any beat space where he hears the rhythm pattern or sonority for which he is selectively listening.[218] Robert W. Sherman and Morris H. Knight applied a different form of this principle, in that the student hears one musical phrase, sees two, and has to indicate which of the two examples represents the heard material.[219]

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216 George Pratt, Michael Henson and Simon Cargill, **Aural Awareness - Principles and Practice.** Milton Keynes: Open University Press, 1990 pp. 43-46, 84-85, 88.

217 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 95.

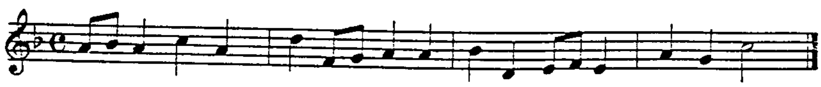
218 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 p. 2.

219 Robert W. Sherman and Morris H. Knight, **Student Workbook for Aural Comprehension in Music Vol. 1.** New York: McGraw-Hill, 1972 p. 53.

A more complex form of selective listening was developed by Walter Kral and Ivo Zopf. The student sees the following example in which there is no rhythmic or harmonic differences between the blocks A-D. Only the pitches vary slightly. An example is played which consists of variants of bars A-D and the student has to indicate the variants used for the example.

Fig. 2.12 Kral and Zopf: Example of a score reading exercise

When for example this melody was played,



the answer should be:

A	B	C	D
1	2	3	4

Examples in which changes in other parameters appear were also presented by Kral and Zopf.[220]

(b) Rhythm reading

The translation of abstract symbols into rhythms can be realised through performing gestures (e.g. clapping, arm movements), using rhythmic syllables, word rhythms and intoning. For more detail on performing gestures see section 4.1.1 (b).

Similarly to the use of pitch syllables in connection with certain pitches and intervals, rhythmic syllables are performed in relation to the reading of note values and patterns. The duration language (*la langue des durées*) developed by Aimé Paris (1798-1866) for the Chevé elementary school of singing is the earliest form of this method of consciously acquainting oneself with with rhythmic processes. A few examples of this approach are: a quarter note is associated with saying *ta*, two eighth notes with *ta te*, a triplet with *ta te ti* and four eighth notes with *ta fa te fe*. A whole beat is always associated with the sound *a*, a two division beat with *a e*, and a three division beat with *a e i*.[221]

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220 Walter Kral and Ivo Zopf, **Gehörbildung - Lehrgang für individuelles Selbststudium Band 1.** Vienna: Österreichischer Bundesverlag, 1989 pp. 50-57.

221 Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978 p. 36.

Several syllable systems based on the principles of Paris were developed through the years. Kodály, for example, used the syllables *ta ti-ti* for the values quarter eighth eighth, and *ti-ri-ti-ri* for four sixteenth notes.[222] Richard Münnich took into account the gravity points within a bar: duple time - *Kai teu*; triple - *Kai pau teu*; Quadruple - *Kai teu pau teu*, etc. Two groups of four sixteenth notes in duple time are for example assigned the syllables *Kai ke kä ke teu re tö te*.[223]

Criteria for an effective syllable system in which rhythmic feeling and aural rhythm patterns can be taught were laid down by Stanley Schleuter. He recommended the use of monosyllabic syllables which are easy to speak or chant by all age groups, using related syllables for duple, triple and unusual meter. Syllables should not:

- duplicate those used in tonal patterns;
- be confused with articulation or tonguing syllables used in wind instruments;
- be introduced concurrently with notation;
- be chanted throughout entire tunes - they are intended for initial use only with pattern sounds.

According to Schleuter, the system that Edwin Gordon adapted from McHose and Tibbs meets all these criteria. An example of this system can be seen in the following:

We/ wish you a mer-ry/ Christ-mas, we/
ni 1 na ta ni ta 2 na ni

An extensive description of this method appears in Schleuter's book.[224]

The system described by Gordon in his *Learning Sequences in Music* (1988), however differs, slightly from the above-mentioned adaptation, in that the syllables *na* and *ni* do not appear, and no provision is made for distinguishing between usual and unusual meters. Gordon distinguished between micro and macro beats, and designed his system so that these beats have different verbal associations.[225] Numbers are never used. The syllable name for a macro beat in all usual meters is *du*, for micro beats *du be*, and for triple micro beats *du da di*. Gordon also devised a taxonomy of rhythm patterns in which usual and unusual duple and triple patterns were organised in an easy-to-difficult ranking order.[226]

Paul Schenk provided reasons for using a syllable system as opposed to the often applied counting system, using numbers and words like *and*: (a) Counting is often performed unrhythmically and unmetrically, especially when counting subdivision values by saying *and*. (b) Musical phrases and bar lines often do not correspond with each

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222 Lois Choksy, **The Kodály Context: Creating an Environment for Musical Learning.** Englewood Cliffs, N.J.: Prentice-Hall, 1981 p. 10.

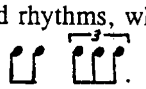
223 Richard Münnich, **Jale - Ein Beitrag zur Tonsilbenfrage und zur Schulmusikpropädeutik.** Wolfenbüttel: Möseler, 1959 pp. 26-39.

224 Stanley L. Schleuter, **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequences.** Ohio, Kent: The Kent State University Press, 1984 pp. 58-80.

225 Macro beats are equal in temporal length and receive no dynamic accent. They form the basis for micro beats and melodic rhythm. (E.g.: 2/4 two quarters.) Micro beats are shorter than macro beats and are derived from macro equal temporal division. (E.g.: 2/4 four eight notes, in groups of two.)

226 Edwin E. Gordon, **Learning Sequences in Music - Skill, Content, and Patterns.** Chicago: G.I.A., 1988 pp. 129-130, 155-160, 264-271.

other, in that the end of a phrase normally does not fall together with a bar line. In most cases a musical arch stretches over a few bars. When counting, a person automatically breaths in before saying *one*, running the danger of destroying the musical phrase. (c) Although the beats are all similar, through counting they get a different numerical value.[227]

Another often used approach is the employment of word rhythms, where rhythmical relationships are portrayed with the help of colloquial words such as *ap-ple, a-pri-cot* = .

The last system to be discussed is that of "intoning" rhythms. As with rhythmic syllables, this approach offers the possibility of giving an exact account of duration, accents and contour when performing rhythmic patterns and/or phrases. This is not possible when clapping or tapping a phrase. Although any syllable can be used for this task, Graybill recommended the use of the consonant *d*, because its attack is clear and flexible, ranging from an explosive marcato to a very gentle legato. He preferred *d* for legato intonements and not *l*, since the latter has a less clear defined attack. Based on his gestural rhythm theory as was described in section 4.1.1. (b), Graybill provided the following guidelines for vocal inflection: (a) A motion towards a phenomenal accent should be intoned with a rise of pitch and dynamic intensification, while motion that forms an accent should be inflected with a descending pitch and dynamic de-intensification (relaxation); (b) Gestural continuity should be expressed by the inflectional contour in that the moment of accent seems to arrive at the crest of a tonally-inflected wave. The hammering out of accents as isolated points of emphasis must be strongly discouraged; (c) Falling into an attack-point mode can be avoided at the beginning stages by using legato articulation to convey gestural continuity. Interpretational characteristics, such as light staccato or marcato, should be incorporated as soon as the rhythmic flow can be expressed fluently.[228]

There are many rhythm textbooks available in which rhythmic patterns are organised from easy to difficult. In most cases no indication is given as to the preferred method of rhythm reading. Two approaches to rhythm reading were determined, namely rhythm reading of short "self-composed" exercises ordered systematically from easy to difficult,[229] or an approach where combinations of rhythmic, melodic and harmonic elements are given. In Markus Ulbrich's *Tabellen zur Notenschrift* rhythmic, melodic and harmonic patterns are presented in Tables and can be combined to form up to 1787 permutations.[230]

Mary Palmer and James Larry Stockton investigated the effectiveness of different methods of rhythm reading. Palmer compared the rhythm reading programmes of Mary Helen Richards, based on the Kodály system, with the methods

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227 Paul Schenk, **Schule der musikalischen Gehörbildung - I. Teil: Gehörbildung Unterstufe und Musikkunde.** (Eight booklets.) Trossingen: Hohner, 1952 p. 10.

228 Roger Graybill, "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 26-25.

229 F. van der Horst, **Maat en Ritme**, Parts I and II. Amsterdam: Broekmans and Van Poppel, [n.d.].

230 Markus Ulbrich, **Tabellen zur Notenschrift - Ein Programm für angehende Berufsmusiker.** Basel: Markus Ulbrich, 1978.

developed by Edwin Gordon. Although the latter appeared to be better than the Richards' method, this result was not clear-cut.[231]

Stockton taught students in the experimental group to perform by rote twelve rhythmic patterns selected by him, using rhythm syllables. Students in the control group analysed the meter components of twelve recorded music excerpts with the aid of rhythm notation. The experimental group participants showed a greater improvement in meter discrimination achievement than the control group participants. He concluded that college students who were taught to perform and identify rhythmic patterns in various meters, achieved a higher level of rhythmic understanding than students who were taught to read, listen to, and to identify various types of meter represented in recorded musical excerpts.[232]

(c) Sight singing

Sight singing (i.e. vocal translation of written symbols) is one of the oldest methods of Aural Training and has its roots in early solmization systems. The sight singing of melodies can take place while (a) using syllables associated with the two main solmization practices, (b) concentrating on various intervals and chords, and (c) in combination with other methods such as conducting while singing.

The general meaning of solmization is phonetically sung tones, always using the same order of syllables for the same sounds, with the same intervals between the same syllable pairs. The inner structure of the tone system is thus represented by the syllables. A shift of the solmization unit to start on a different tone but with the same proportions is called mutation. The proportion rules can differ from epoch to epoch and from nation to nation.[233]

Solmization is not a purely Western phenomenon. The use of syllables in conjunction with certain intervals goes back to Pre-Christian times. For example, in Bali and India, a scale sung on the syllables *Sa ri ga ma pa dha ni (sa)* was used ca. 200 B.C. - 500 A.D. A Chinese five-tone scale on the syllables *Kung-Shang-Kio-Chi-Yü* was first described in detail by the theorist Cheng Hüan in the 2nd Century A.D.[234]

In the Western music tradition, Aristides Quintilianus (1st and 2nd Century A.D.) and Anonymus reported that the Ancient Greeks used the Dorian tetrachord (**τα-τη-τω-τε**), with its semitone always between the first and the second note in their solmization system. Although the early church did not make use of solmization, the use of intonation formulas for the church modes in the eighth century was something similar. These formulas held information on the

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[231] Mary Palmer, "Relative Effectiveness of Two Approaches to Rhythm Reading for Fourth-Grade Students" in **Journal of Research in Music Education**, 24/3 (1976) pp. 110-118.

[232] James Larry Stockton, "An Experimental Study of Two Approaches to the Development of Aural Meter Discrimination among Students in a College Introductory Music Class" in **Dissertation Abstracts International,** 43/3 (September 1982) p. 718-A.

[233] Georg Lange, "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breitkopf and Härtel, p. 534.

[234] Martin Ruhnke, "Solmisation" in **Die Musik in Geschichte und Gegenwart**, 12 p. 843.

repercussion tone, final tone and semitone relationships within the mode. The semitones, however, were not always connected with the same syllables.[235]

Although his was not a solmization practice, Odo of Cluny (d. 942) used a monochord to teach choir boys antiphones. He found that the boys learned quicker if all the antiphones were.marked with the same letters on the monochord, as when somebody sang the antiphones for them. After a few months of training the boys were able to sing by sight alone, "something which until now ordinary singers had never been able to do, many continuing to practice and study singing for fifty years without profit".[236]

Also during the Middle Ages, it is believed that the Italian monk and music instructor Guido of Arezzo, (995-1050?), invented the hexachord system in which the syllables *ut, re, mi, fa, sol, la* were connected to the six hexachord tones. The system is normally attributed to Guido, although he mentioned it only once in a letter to one of his colleagues in Pomposa. The six syllables were derived from the beginning syllables of the St. John hymn, of which the text was apparently written by Paul Warnefried (ca.730-799), also known as Paul Diaconus. It consisted of three verses of which Guido used only the first.

It is speculated that Guido composed the melody for didactical purposes, because each phrase starts a step higher than the beginning note of the previous phrase. Other melodies in which the same text was used did not have this characteristic.[237] The melody was as follows:[238]

Fig. 2.13 *Ut queant laxis* melody

C D F DED	DDCD EE
Ut queant laxis	*re*sonare fibris
EFGE DECD	F G a GF ED D
*mi*ra gestorum	*fa*muli tu-o- rum.
Ga GFE F G D	a G a FG a a
sol-ve polluti	*la*bii re-a-tum
GF ED C E D	
sanc-te Johannes.	

[235] Georg Lange, "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breitkopf and Härtel, pp. 536-539.

[236] Odo of Cluny, "Enchiridion musices" in Oliver Strunk, **Source Readings in Music History**. New York: W.W. Norton, 1950 pp. 103-107.

[237] Jacques Chailley, "Ut queant laxis et les Origines de la Gamme" in **Acta Musicologica** LVI (1984): Facs. I p. 57.

[238] Guido Aretinus, **Epistola Guidonis Michaeli Monacho de ignoto cantu directa.** German translation by M. Hermesdorff, **Brief Guido's an den Mönch Michael über einen unbekannten Gesang**. Trier: Paulinus-Druckerei, 1884 p. 21.

Guido's system spread rapidly. It consisted of seven hexachords built on G, C, F, G, C, F, G. They were "major" hexachords because the semitone was in the middle (always between *mi* and *fa*). All the hexachords that started with C were called the *naturale*, those starting with F the *molle*, and those starting with G the *durum*.[239]

Other hymns also served the same didactical purpose using the syllables *Tri pro de nos te ad*, and *An Chi Tho Gen Mi Lux*. Lange speculated that some syllables (*Tri pro*, etc.) were used in the Italian, and others (*ut re mi*, etc.), in the Gallic, Anglo-Saxon and Alemannic regions.

As to the origin of the word *solmization*, Andrew Hughes pointed out that, because of mutation practices, it sometimes happened that *sol* and *mi* were placed adjacent. This lead the Renaissance theorists to derive the term solmization. Medieval writers used only the noun *solfatio* and verb *solfare*.[240] Other uses of the word are: *Ars solfandi, solfization, Solfa, Soffa, Somifacoi, Solfare, Solvare, Solfiare, Solfixare, Solfisaro, Solmizare, Solfeggio* and *Solfeggiare*.

Solmization also had some influence on the compositional techniques of the Renaissance. For example, Josquin des Préz (1450-1521) created the following melody from his employer's name in which each syllable was connected with the corresponding solmization syllable:

Her-	cu-	les	dux	Fer-	ra-	ri-	e
re	ut	re	ut	re	fa	mi	re
D	C	D	C	D	F	E	D[241]

In the twentieth century Hans Joachim Moser (1923-1933) created a free translation of the *Ut queant laxis* text for the hexachord G-E, using the same melody:

> "Gib, dass mit lockerem Ansatz können singen
> behr, was du tatest, Chöre deiner Schüler,
> dass dich ohn' Fehlen ehren unsre Lippen,
> Heiliger Johannes."[242]

The history of solmization systems (hexachords, heptachords, octochords and systems which include twelve tones) was covered in detail by Stoverock.[243]

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239 Georg Lange, "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breitkopf and Härtel, pp. 541-545.

240 Andrew Hughes, "Solmization" in **The New Grove Dictionary of Music and Musicians**, 17 p. 461.

241 Curt Sachs, **A Short History of World Music.** London: Dennis Dobson, 1956 p. 123.

242 Karl Rehberg, "Geschichte in der Musikerziehung" in Hans Fischer (Ed.), **Handbuch der Musikerziehung**. Berlin: Rembrandt, 1964 p. 32.

243 Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978 pp. 7-13.

It is important to note that two main developments of solmization can be distinguished, namely the moveable doh and the fixed doh systems. The solmization systems that were developed on the Guidonian principles were all moveable doh systems. In these the tonic is presented by *doh* in a major key, and *lah* in a minor key.[244]

The fixed doh systems were first presented by the Frenchman M. Loulié in 1741, and appealed to singers who used the syllables of solmization to construct vocal exercises (*vocalizzo* or *solfeggio*). The idea of transposing scales was totally dismissed and the seven tones of the C major scale were fixed to the seven solmization names *ut re mi fa sol la si*. Each of these syllables could be changed by adding a flat, sharp or natural sign. The pronunciation was, however, problematic. C sharp was, for example, called *ut dièse*. Solutions to this problem were offered in the form of a chromatic syllable scale such as *ut de re ma mi fa fi sol be la sa si* of Boisgelou.[245] Other forms of chromatic absolute systems are those of Carl Eitz and Peter Koch.

Based on these two major solmization developments, Timothy A. Smith described different manifestations of the fixed doh and moveable doh systems in use in the twentieth century. In the absolute or fixed doh category, he discussed the (a) **seven-syllable fixed doh** (*do re mi fa sol la si* representing the natural pitches C-B with all their chromatic inflections, e.g: C flat, C natural and C sharp are all do); (b) **chromatic fixed doh** (ascending: *do di re ri mi fa sol si la ti do*, and descending: *do ti te la le sol se fa mi me re ra do*); (c) **chromatic fixed** "A" (Letter names are used in favour of syllables, e.g.: G major would be sung as G A B C D E F sharp G.)[246] Advantages and disadvantages of these systems were also discussed. It was argued that fixed doh systems are well-suited for atonal and modulating music, and that it could possibly aid the development of perfect pitch. Three objections were, however, raised. The first is based on the historical implications of the word solmization. Solmization is a method of identifying pitch names by scale degree, which is not the case in fixed doh systems. Secondly, the twelve-syllable fixed doh presents certain technical difficulties (e.g. how to take into account double sharps and flats), and thirdly the paucity of meaning that fixed systems carry with regard to analytical processes. They cannot describe or reinforce the perceptual structures of tonality.

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244 During the eighteenth century minor scales were also sung on *re mi fa sol la si ut*.
Georg Lange, "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breitkopf and Härtel, p. 594.

245 Georg Lange, "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breitkopf and Härtel, pp. 595-596.

246 The German variant of this system makes use of the post-fixes *is* for sharps, and *es* for flats. G sharp is, for example named *Gis* and E flat *Es*. The post-fixes are doubled in the case of double flats and sharps, e.g. F double flat is *Feses* and C double sharp *Cisis*.

In the moveable doh domain three systems were discussed: (a) **Number singing, moveable 'one'** (For both major and minor, tonic is *one*, dominant *five*, etc.),[247] (b) **'Lah-minor' moveable doh** (This system is derived from the Glover-Curwen *tonic sol-fa* and reflected in the German *Tonika-Do*. The tonic of a minor is called *lah* with the semitones always between *mi-fa* and *ti-doh*),[248] and (c) **'Doh-tonic' moveable doh** (The tonic is called *doh* regardless of mode or key in both major and minor, and it has the capacity of negotiating chromatic configurations. Semitones occur at different places in each mode.).

Smith, who admitted being biased towards the moveable doh system, then illustrated how 'Doh-tonic' can express the different qualities of equivalent enharmonic intervals. The interval D - A flat in a c minor context sung with the syllables *re le*, differs from the D - G sharp interval in the context of A major sung with the syllables *fa ti*. This ability to portray structural relationships is the main characteristic of the 'Doh-tonic' system. Smith also pointed out that students trained in moveable doh have the option of ignoring tonal associations and making the system "fixed" for the purposes of singing atonal music. He also regarded the fact that moveable doh is slower than fixed doh systems as positive, because students are forced to analyse before naming, a desired activity from a didactical view point. It is the only system that meets his requirements for an ideal system: analytical orientation (perception of musical structure), aural orientation (first recognise sounds, then symbols), consistency in phonemic association of musical structures with syllables, singability and stylistic flexibility (diatonic, modulating and chromatic music, atonal music).[249]

Thom David Mason saw the value of the moveable doh in helping students to "hear" relationships between tones before playing or singing them. This skill is indispensable for jazz players if they want to improvise on the level where they can play, using ideas that they have not used before, drawing on their fund of knowledge and combining elements that were formerly apart.[250]

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247 The application of numbers to indicate the degrees of the scale can be traced back to Johannes Andreas Bontempi in 1660. The method has been used by many people, including a disciple of the noted Swiss educator Pestalozzi, Hans Georg Nägeli (1773-1836) who printed melodies in 'figure notation'. In the system of Pierre Galin (1786-1821), Aimé Paris (1798-1866) and Émile Chevé (1804-1864), the numbers were to be looked at while singing with moveable syllables. Friedrich Silcher (1789-1860) recommended the printing of numbers above/below the notation, and Lowell Mason (1792-1872) printed songs in both syllable and number notation.
Dietrich Stoverock, **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978 pp. 17-22.
Arpad Darazs and Stephen Jay, **Sight and Sound - Visual Aid Melody and Harmony.** Oceanside, New York: Boosey and Hawkes, 1965 p. 8.

248 Paul Telesco criticised the use of Lah minor as being an interval approach. His goal, when teaching tonal sight singing, is to hear the functional relationships between notes in a key: their relationships to each other, and their relationship to the tonic. Because of this he uses the moveable doh-tonic for both major and minor keys.
Paula Telesco, "Contextual Ear Training" in **Journal of Music Theory Pedagogy**, 5/2 (Fall 1991) pp. 180-181.

249 Timothy A. Smith, A "Comparison of Pedagogical Resources in Solmization Systems" in **Journal of Music Theory Pedagogy**, 5/1 (Spring 1991) pp. 3-22.

250 Thom David Mason, "The Case for Moveable 'Do' - Solfege as a Practical Tool for Improvisors" in **Proceedings of NAJE Research**, 7 (1987) pp. 95-96.

Apart from the application of the above discussed solmization systems, musical phrases can also be sung on any arbitrary syllable such as *la*, or making use of Jazz scat singing practices (e.g. *du be du be*), with the main emphasis placed on interval and chord recognition and singing. McLoud McGaughey created 'vocalises' based on major scale intervals with students actually singing 'perfect prime, major second', etc.[251] The fact that Greta Bredemeier Johnson found the interval approach to be the most frequently selected method to teach sight singing in high school choral music classes in 1987 is not surprising seen in the light of the vast majority of sight singing texts in which melodies were organised according to interval size.[252]

Gould suggested a linear and harmonic approach to sight singing. In the first approach "musical construction" is conceived in terms of the diationic scale. Intervals that are larger than diatonic seconds are constructed as a chain of seconds. In the second approach the triad is used as a reference tool. Melodies are interpreted as pitch paths through a series of one or more triads and seventh chords. While singing, the chords can be played on the piano.[253] Leland Bland also approached sight singing through what he called melodic analysis based on chord recognition and passing notes.[254] Robert Ottman also approached intervals through chords.[255] Rapid recognition of various structural factors such as the repetition of melodic units, cadences, chord skips etc., as well as the habit of looking ahead, should be cultivated.[256] Tonal melodies based on chords or certain intervals are often combined with singing on moveable syllables.[257] Bruce Benward printed three solmization systems (two moveable and one fixed doh) underneath one of his melodies, which were organised according to interval and triad species. His book is also one example of many recent textbooks in which correct phrasing and dynamics are strongly recommended as a part of interpreting what is sung.[258]

Being aware of the gestural quality of all music, Graybill pointed out the pedagogical task in sight singing or rhythm training is not one in which a melodic line is implanted onto an abstract durational sequence. He rather viewed pitch as a factor that contributes to gestural shape by strengthening, qualifying, or even undermining a dynamic shape implied in the duration series alone. The interaction of melodic pitch and meter therefore is an important aspect of

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251 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 p. 75.

252 Greta Johnson Bredemeier, **A Descriptive Study of the Pitch-Reading Methods and the Amount of Time utilized to Teach Sight Singing by High School Choral Teachers in the North Central Region of American Choral Directors Association.** Master's thesis, University of Nebraska 1987. Ann Arbor, Michigan: University Microfilms International, 1987 p. 71.

253 Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 p. 3.

254 Leland D. Bland, **Sight Singing through Melodic Analysis.** Chicago: Nelson-Hall, 1984.

255 Robert W. Ottman, **Music for Sight Singing.** Englewood Cliffs, N.J.: Prentice-Hall, 1956.

256 Maurice Lieberman, **Ear Training and Sight Singing.** New York: W.W. Norton, 1959 p. 30.

257 Edgar Growe, Annie Lawton and Gillies W. Whittaker (Eds), **The Folk Song Sight Singing Series, Books 1-12.** London: Oxford, 1933.

258 Bruce Benward, **Sightsinging Complete.** Dubuque, Iowa: Wm.C. Brown, 1973 pp. 1 and 4.

which a musician should be aware. In some cases the melodic contour does not necessarily reinforce the metric accent. A prerequisite for performing a gesture convincingly is to recognise its wholeness in advance.[259]

Sight singing is also often combined with other tasks such as conducting and playing on an instrument. This is a more complex form of reading since the student has to concentrate on more than just singing the right pitches. Richard P. DeLone is only one of many who combined sight singing with meter indication.[260]

Sol Berkowitz et al. combined playing at sight with sight singing in that one hand plays one voice on the piano while another voice is sung from sight.[261] This can become very complicated if one voice has to be sung and three others played, or the rhythm of one voice has to tapped, another played and a third sung. The possibilities of this approach are endless, especially when students are expected to interpret the music taking into account Graybill's gestural approach.

The combination of various aural tasks was described by Davidson and Scripp as the merging of the *kinesthetic* (instrumental repetition without structural knowledge), *external* (external vocal reproduction necessary in order to maintain the intonation of the notes of a melody) and *internal* (inner hearing) modes of representation. The authors argued that sight singing should be understood from a multi-dimensional perspective, and developmental psychological research in which stages of intellectual development are described should therefore considered. Taking into account the developmental stages defined by Piaget, research on musical pitch development and analyses of typical errors made by children when singing, it was illustrated that children's grasp of tonal relationships develops in that an increasingly large repertoire of contour schemes are integrated into more stable structures (scales). They were increasingly able to conserve melodic structures across many transpositions.[262]

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259 Roger Graybill, "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 37 and 43.

260 Richard P. DeLone, **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981 p. 10.

261 Sol Berkowitz, Gabriel Fontrier and Leo Kraft, **A New Approach to Sight Singing**. New York: W.W. Norton, 1976 pp. 257-317.

262 Gould also analysed students' sight singing errors, because they provide information on the thinking processes involved. He observed that, "when things go wrong in sight singing, what seems to be happening is this: Students attempt to scan and interpret a *next* pattern of notes. Unable to construct this new pattern spontaneously, they respond in part with what is in the mind's ear at that moment: some portion of an immediately preceding, similar pattern; short-term memory of what was just constructed seems to preempt a relatively insecure next effort at construction. It is as if students actually try to construct the next pattern in terms of the previous one, a strategy that must often fail. For, while the previous pattern has the immediate advantage of *concreteness*, it has the disadvantage of being a segment of structural- rather than perceptual-level material; while at the same time, the appropriate referential tool for perceptual decisions - the diatonic scale - may be unavailable just because it must first of all be securely *imagined* in order to be used. On the positive side, it is important to recognize that these sight-singing distortions are not instances of 'unthought' - of irrational mistakes pure and simple. ...Though we naturally reject such 'recompositions', the capacity to commit them is a clear sign that the student has the ability to think, and therefore learn, musically."
Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 pp. 1-2.

Likewise, freshman college students bring with them a vocabulary of contour schemes, the perceptual knowledge of tonal functions, an introductory knowledge of the scale, and years of instrumental training and exposure to music literature. Referring to Piaget's two contrasting levels of thinking (figurative and operational) and the modes of representation, Davidson and Scripp maintained that

> "...the construction, visibility, and operational use of knowledge has more to do with the thinking involved in problem solving than with the acquisition of skills by relying only on rote learning or drill and practice. Ultimately, in classes based on a developmental premise, students come to understand that the end state of sight singing courses can have more to do with the internalization of these processes than with the refinement of performance practice alone."[263]

The authors designed an instructional framework taking into account the abovementioned psychological concepts of internalization and operationality. Three performance modes are constantly in use in the framework: "1) *note identification* - decoding the identity of written pitches across various patternings and clef references; 2) *rhythmic expression* - rhythm produced within various meters and using various patternings eventually linked with note names, in reference to tonal centers, and eventually with combined rhythm; 3) *pitch expression* - pitches produced vocally with note names, in reference to tonal centers, and eventually combined with rhythm." They distinguished different skill levels where mastering the first level is a prerequisite for moving on to the second level. Combined modes of representation, e.g. singing with syllables, conducting while singing, etc. were recommended.[264] An example of their pedagogical framework explained with the aid of a target melody as well as an example of sight singing on level one (first semester) appears in Appendix B.

Based on her research results, Doris Hutton recommended the use of audio-visual materials such as films, slides, filmstrips, musical games and recordings as an aid to sight singing classes, because visual materials often simplify the learning process and diminish the effort required to understand abstractions.[265]

Due to the fact that *intonation* forms an essential ingredient of both imagination and pitch reading tasks, the development of this skill has an important place in sight singing and reproduction tasks. Trubitt and Hines, however, pointed out that hearing if an interval is exactly in tune can hardly be taught. They provided an exercise where a drone tone is played to which students have to sing and compare intervals.[266]

Roland Mackamul devised intonation exercises for four students who should sing four tones from sight. After the first tone is sung, it should be sustained until the three others sound. While the chord is sustained, the teacher

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263 Lyle Davidson and Larry Scripp, "Sightsinging at New England, Part One: A Developmental view of Sight Singing" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 10-21 and 22.

264 Larry Scripp and Lyle Davidson, "Sightsinging at New England Part Two: Framing the dimensions of Sightsinging: Teaching toward Musical Development" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 27, 28, 32-33, 40-41.

265 Doris Hutton, "A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade" in **Journal of Research in Music Education**, 1 (Fall 1953) pp. 119-126.

266 Allen R. Trubitt and Robert S. Hines, **Ear Training and Sight-Singing: An Integrated Approach, Book I.** New York: Schirmer Books, 1979 p. 18.

indicates which voices should be changed by saying to one student 'a fifth higher', to another 'an octave lower', etc.[267]

Instrumental intonation training was suggested by Sprenger. He recommended that an interval should be performed by two orchestra players while a group of listeners comment on the tuning and make suggestions until the interval is in their opinion in tune. The same can be done with a chord played on three instruments, either from the same or a different instrument group. In another exercise the A string of a few violins should be tuned according to the piano while playing a different triad for every instrument, e.g. d minor, F major, A major, etc. The different A strings should then be compared with each other.[268]

4.1.6 Transcription tasks

These tasks imply the reproduction of what was heard by means of written dictation which can be in the form of traditional notation, other stave systems, and non-traditional notation such as graphs. Obviously combinations of these can also occur.

In the first two forms the ability to transpose aural images into visual symbols of discrete pitch-time factors is needed and should be fostered. Comments on dynamics and articulation affecting timbre are more general. While the use of precise notation functions on a detailed level, graphs provide for a holistic conception of compositional structure. The use of graphs offers advantages over precise notation and often serves as a prerequisite for precise dictation. It starts with broad outlines upon which details can be layered, and it can reveal information about all structural parameters. If a student is unable to make broad graphic statements on the musical structure, more detailed statements are liable to lack adequate context.[269]

According to Heinrich Martens, the principle of transcription is as old as music education itself. He maintained that the problems of memory-based singing were recognised even before the times of Guido of Arezzo and Hucbald. Early developments of notation served as mnemonic devices. This is not a method of Aural Training and the history of notation is therefore not discussed here in detail.

Martens pointed out that masters and pupils actually practised dictation skills in the late Middle Ages when they applied mensural notation. In the *Sachsen-Coburg-Gothaischen Schulordnung* (1605) it was recommended that the money earned through singing at weddings and other occasions should be used to buy manuscript paper in order to transcribe a musical composition every few weeks. Influenced by Johann Adam Hiller, Peter Weimar in 1792 advised that dictation should be practised in public schools. The incorporation of dictation as an Aural Training method into Music Education was also advocated, amongst others, by: Heinrich Goethe, Pestalozzi (1810), Friedrich Wilhelm III

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267 Roland Mackamul, **Lehrbuch der Gehörbildung - Band 1, Elementare Gehörbildung.** Kassel: Bärenreiter, 1969 p. 39.

268 Hermann Sprenger, **Methodik der Gehörbildung**. Unpublished manuscript, [n.d.] p. 52.

269 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 81-89.

(1854), N. Schelble (1789-1837), C. Reinecke, A. Lavignac (1882), Hugo Riemann (1889), and Alexis Holländer (1913).[270]

(a) Traditional notation

Several approaches to dictation based on traditional notation were found. In teaching practice different approaches are often combined to teach students different ways of problem-solving. All dictation assignments can include one or more than one voice.

1. *Prepared dictation*: In this preliminary form of written dictation students incapable of transcribing an unfamiliar piece may be permitted to study the music for a short while before it is dictated. Another form can be to prepare an excerpt of a musical score in that a few notes, rhythms and/or bars are missing. The student then has to complete it.[271] The latter method is discussed in more detail in section 4.1.8.

2. *Isolated parameter dictation*: The parameters pitch and rhythm are often treated separately before they are combined in musical phrases. A row of pitches can, for example, be given and the student has to write down the rhythms.[272] Or, a rhythmical phrase can be given where one beat is changed each time the phrase is repeated. The student then has to notate the changes.[273] A variant of this approach is that all the notes have the same value in a pitch dictation. Theo Willemze described what he called the 'relative interval mini dictation'. Two tones are played simultaneously after which they should be named, using tonic solfa syllables, e.g. *mi/doh*.[274] Examples of dynamic/character dictation can also be seen in the work of Annie Warburton in which students have to mark in dynamics and tempo indications.[275] This approach is related to the prepared dictation approach.

3. *Retrograde dictation*: Willemze pointed out that many students often tended to stagnate at a note at the beginning of a musical phrase and did not think of continuing to notate what they already knew. He recommended that students should deliberately concentrate on remembering the last note of a fragment, and should compare this note with the last note of the next phrase. In order to practise this skill, mini dictations consisting of only two notes should be taken. The name of the second note is given and the student has to figure out what the name of the first note is. The same principle can be applied to scale, triad and instant dictations. Only the name of the last note is made known. A variant of this can be to name the highest, lowest, longest etc. note as reference pitch.[276]

4. *Combined parameter dictation*: This form is the counterpart of isolated parameter dictation and as a rule includes the pitch and duration parameters. Examples from the music literature, as can be seen in the list by McLoud McGaughey, provide excellent material for combined parameter dictation. Her list of melodic

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[270] Heinrich Martens, **Musikdiktat und musikalisches Schreibwerk in der Schule mit anschließendem methodisch-didaktischem Lehrgang.** Wolfenbüttel: Möseler, 1957 pp. 11-14.

[271] Rupert Thackray, "Some Thoughts on Aural Training" in **The Australian Journal of Music Education,** October 1975 p. 26.

[272] Monika Quistorp, **Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel, 1979 p. 9.

[273] Christoph Hempel, **Gehörbildung - Anleitung und Material für das gemeinsame Üben.** Zürich: Karl Heinrich Möseler, 1976 p. 4.

[274] Theo Willemze, **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969 pp. 315-316.

[275] Annie O. Warburton, **Graded Aural Tests.** London: Longman, 1971 pp. 257-263.

[276] Theo Willemze, **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969 pp. 322-323.

excerpts is ordered in an easy to difficult ranking order.[277]

Several authors, for example Maurice Lieberman, provided exact guidelines for students when taking down dictation, and Michael Illman provided exact procedures for teachers who are giving dictations.[278] Lieberman advised that the melody should be memorised before notating it. The next steps included: determining the beginning note, setting down the correct key signature, writing the scale-step numbers for the dictated melody while checking it against the first, third and fifth tones of the scale, translating numbers into notes on the stave, determining meter, listening for the strong beat and placing a bar line before every tone on an accented beat. The rhythm of each measure is finally determined.

In Illman's procedures, pauses between the different steps are exactly indicated as 'pause 40/45 seconds'. The key has to be named first, allowing time for the key-signature to be written down. The pulse-rate is indicated by tapping, the tonic chord played followed by the keynote, after which the complete example is played straight through. Pause. The tonic chord is then announced followed by the first section. Pause. Repeat first section, pause. The same procedure is followed with the second section, after which the complete passage is played.

Clemens Kühn, however, criticised procedures in which dictation exercises are repeated without comment until all students have finally notated them. This type of procedure provokes a continuous "thoughtless" approach.[279] Analysing what was heard in terms of general and detailed characteristics is needed.

These analytic principles can clearly be seen in the four phases of music perception described and applied to melodic dictation by Gary Karpinsky: *hearing* (factors such as nervousness, physical or neural deficiencies can influence listening), *memory* (the ability to "chunk" information into meaningful patterns), *understanding* (figuring out the rhythm should precede the pitches in order to provide a framework in which to place the pitches, starting with perception of pulse, meter and then durations). In figuring out the pitches, Karpinsky criticised the frequent practice of playing the tonic before a musical phrase is dictated, as one that does not appear in an actual performance. He recommended the use of moveable doh systems to express contextual relationships. The last phase is that of *notation* (translating understanding into musical symbols).[280]

5. *Instant dictation*: What has to be notated is heard only once.

6. *Variation dictation*: A theme with its variations is dictated.[281] Another form of this approach is seen in the method of Bernard Sekles, who divided his dictation book into thirty sections. In each section a "theme" such as the tonic triad forms the core of the whole section. Varied forms of this triad appear in all twelve keys in four-bar phrases. The same is done with different rhythm patterns which are combined with the pitch themes.[282] The scale, triad and sequence dictations explained by Willemze also fall into this category.[283]

7. *Long-term retention dictation*: Known pieces, folksongs or instrumental pieces played before should be dictated from memory. The notated part can be compared with the aural image by playing it on an

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277 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 pp. 114-117.

278 Maurice Lieberman, **Ear Training and Sight Singing.** New York: W.W. Norton, 1959 pp. 29-30.
Michael Illman, **Systematic Aural Training - Teacher's book.** London: Longman, 1974 p. 33.

279 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 pp. 14-15.

280 Gary S. Karpinsky, "A Model for Music Perception and its Implications Melodic Dictation" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 195-229.

281 Hermann Grabner, **Neue Gehörübung.** Berlin: Max Hesses, 1962 p. 23.

282 Bernhard Sekles, **Musikdiktat - Übungsstoff in dreissig Abschnitten.** Mainz: Schott, 1901.

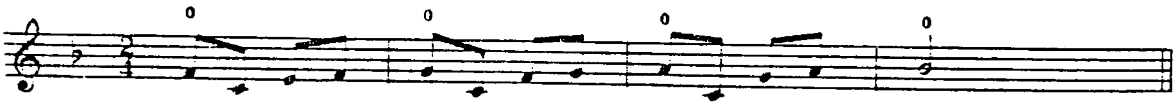
283 Theo Willemze, **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969 pp. 316-317.

instrument.[284]

8. *"Instrumental" dictation:* What was heard is reproduced on an instrument before notating the solution. By playing the notation its correctness is examined. One benefit of this approach is that problems of pitch matching are separated from those of notation. Each problem can be worked at empirically, proposing, testing and revising the heard 'theory', and how it is notated.[285] This form of dictation is actually nothing other than an instrumental reproduction task such as those described in Section 4.1.2.

9. *Step progression dictation*: Benward defined step progression as "that organizing factor in some melodies which provides direction. These organizing tones or step progression tones lead the melody either up or down, and the other tones of the melody are interwoven around them." This can best be described by the following example:[286]

Fig. 2.14 Benward: Example of step progression dictation



Theo Willemze referred to this approach as "listening around the corner", which is nothing more than storing different reference pitches in the short-term memory.[287]

10. *Cadence dictation*: Different cadences have to be recognised and written down.[288]

11. *The reductionist approach to harmonic dictation* (microscopic listening): Jay Rahn and James R. McKay pointed out that students arrive at a conclusion about the whole (chord or chord progression) on the basis of its smallest parts (the individual notes of a chord, or the individual lines of a texture).

12. *The holistic approach to harmonic dictation*: This approach forms a counterpart to the reductionist approach in that a chord or chord progression is identified and dictated on the basis of its 'overall sound'.

13. *The Guide-tone approach to harmonic dictation*: Rahn and Mckay saw weaknesses in the approaches described in 11 and 12, and recommended a "middle-ground" between the two, namely the Guide-tone method. The reductionist approach was criticised for providing more detail than necessary, and for the fact that an isolated mistake in a part could have an extreme influence on the assessment of the whole. Critique on the holistic approach was that a chord could easily be identified wrongly.

In the Guide-tone method the following principles are followed: "a) the orthodox pedagogical progressions from known to unknown, from simple to complex, from the concrete to the abstract, as well as the notion of a learning spiral; b) the behaviorist view of learning as a process of operant conditioning subject to differential reinforcement; and c) the general conviction that different skills in a multifaceted subject matter ... are best learned according to an integrated rather than a piecemeal approach."

In the first phase of this method, students are expected to identify whether the first degree of the scale (*doh*) or the seventh (*ti*) is present in the chord played in close position. When this is achieved, students can proceed to choral identification. Students are asked to sing the other notes in the chords (*doh mi soh, re ti soh*) applying the moveable doh system, thus recognizing it as tonic or dominant. The subdominant is then introduced. In more advanced stages secondary triads are introduced, based on moveable doh syllables. Singing chains of

284 Clemens Kühn, **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983 p. 57.

285 Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 p. 5.

286 Bruce Benward, **Workbook in Advanced Ear Training - Teachers Dictation Manual.** Dubuque, Iowa: Wm. C. Brown, 1961 p. 10.

287 Theo Willemze, **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969 pp. 323-324.

288 Theo Willemze, **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969 p. 362.

broken chords precede dictation tasks.[289]

14. *Polyphonic dictation*: Kurt Böhm maintained that two-part dictation only makes musical sense when both voices are dictated at the same time, treated as a whole.[290]

Finally, Gary Potter examined twenty-five subjects taking dictation in order to define successful dictation strategies. He collected data through the use of different coloured pens for each successive hearing, tape recordings of each dictation session, and observations. Acknowledging the limitations of his study, Potter concluded that: (i) Rhythmic understanding is indispensable in dictation; (ii) Subjects who thought in terms of moveable doh systems did significantly better than those who applied an interval strategy; (iii) Although fewer subjects reacted to implied harmonies in the dictated melodies than expected, this ability should be fostered; (iv) Subjects who were able to recognise patterns (clichés) scored higher than others who did not have extensive musical backgrounds; (v) Subjects who started writing during the first hearing did better than those who first listened while trying to "make a mental tape to be played back at will";[291] (vi) The dictation strategies of the best subjects included a variety of different dictation approaches and knowledge of other subjects.[292]

(b) Other stave systems

The "accumulated" stave and Hohlfeld notation systems described in this section are mainly used to notate pitches. In the first system, students first work with only one line with *doh* just below the line, *re* on the line and *mi* above the line. During the next phase a second line is introduced to incorporate the syllables *fah* and *soh*. In the same way the remaining three lines of the stave are added. This "accumulated" stave thus serves as a preliminary phase to traditional notation.[293] Agnes Hundoegger used the same principle. *Doh* was, however, not always below the first line, but could be on any of the five lines, indicated by a D written on the particular line or space.[294]

Based on his theory of melody in which Christoph Hohlfeld distinguished between "autonomous" tones and integrated tones, he developed a notation system for dictation purposes to accompany his theory. The crux of this theory is that "affinity" fields are built around one tone which is not the product of something else, but is the main

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289 Jay Rahn and James R. McKay, "The Guide-tone Method: An Approach to Harmonic Dictation" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 101-102, 103, 104-111.

290 Kurt Böhm, "Das Konzept der Gehörbildung an der Musikakademie und am Konservatorium Zürich" in **Schweizerische Musikzeitung**, 122/6 (November/December 1982) pp. 373-374.

291 This observation was commented on by Gary Karpinsky who suspected that Potter's subjects had not been trained in the application of selective and accurate memory. According to Karpinsky, students should not be encouraged to write while listening because this approach will develop "fleets of musical short-hand takers, perhaps adept at getting the right thing on paper but lacking in skills such as focused attention, selective memory, and increased memory capacity." He quoted Rogers who pointed out that the goal of dictation is to develop hearing meaningful patterns.
Gary S. Karpinsky, "A Model for Music Perception and its Implications in Melodic Dictation" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 199.

292 Gary Potter, "Identifying successful Dictation Strategies" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 63-71.

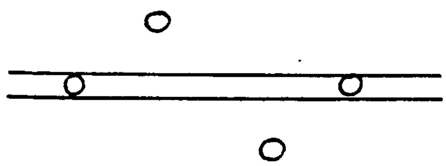
293 C. Foster Brown, **The Sight and Sound of Music.** London: Barrie and Rockliff, 1969 pp. 4-10, 18-24.

294 Agnes Hundoegger, **Leitfaden der Tonika-Do-Lehre.** Berlin: Tonika-Do, 1925 pp. 40-41.

element around which everything is centred. This he called the autonomous tone, valid for a whole piece, or only a section. The tones centred on this autonomous tone are called "integrated" tones. Although the autonomous tone sometimes coincides with the tonic in tonal music, it should not be confused with it. Several examples from different style periods were given to support his theory.[295] This theory differs from an interval approach in that inner relationships and tensions between tones are taken into consideration.

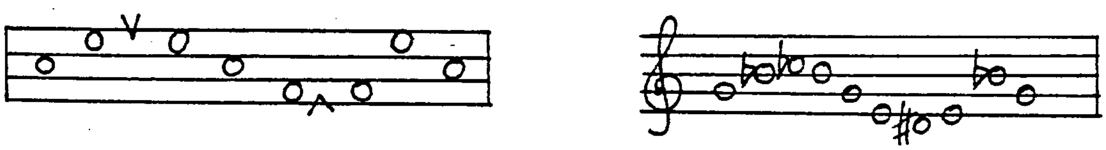
In his Aural Training, Hohlfeld developed a notation procedure in order to portray the autonomous tone with its affinity fields. In the first dictation class, pupils have to distinguish between sounds and noises. On a clean page students have to draw circles for recognizing sounds, and short horizontal lines for recognizing noises. Tones with the same pitches are written on the same height, with others higher or lower. The autonomous tone is surrounded by two parallel lines above and below the tone:

Fig. 2.15 Hohlfeld: Example of the notation system to portray autonomous tones and affinity fields

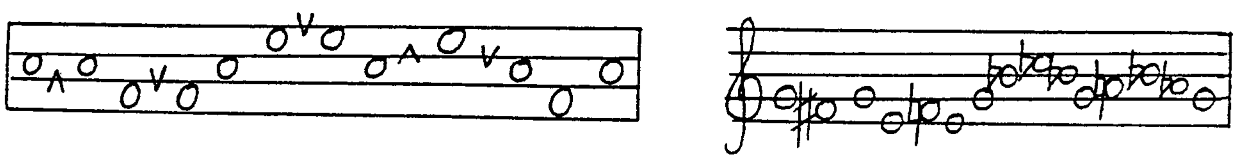


The first field to be indicated on his symmetrically-based stave is the minor third up- and downwards, by adding two extra parallel lines:

The next step is to indicate tones that strive to leave this field,

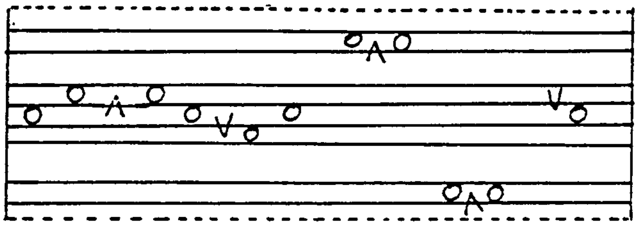


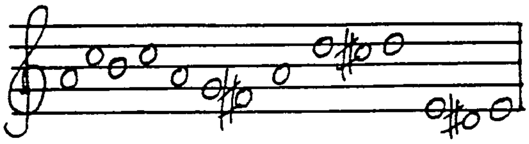
followed by tones that tend to strive to other tones within this minor third field: Tension towards an upper tone or lower tone is indicated by a sign pointing upwards or downwards respectively. The major third is not yet introduced but enharmonically resembles the diminished fourth in this context:



The second affinity field is now introduced. The fourth interval has, according to Hohlfeld, a different profile when compared to the minor third sphere. A new affinity field which also centres on the minor third, is entered:

[295] Christoph Hohlfeld, **Theorie der Melodie.** Unpublished manuscript, [n.d.].





Finally the ambitus can be broadened by indicating the major third and descending fifths.[296]

(c) Non-traditional notation

Parallel to the development of mid-twentieth-century music, non-traditional notation started to play an increasing role in music education. According to Erhard Karkoschka the idea of presenting electronic music in the form of an "aural" score (Hörpartitur) was born in the 1950s. An example of such an "aural" score is Rainer Wehinger's *Hörpartitur zu Ligeti's Artikulation* (1970).[297]

Seven years later Theo Schlager presented a prototype apparatus that could produce simple "aural scores". It had ten buttons to which ten different functions such as instruments, intensity, texture etc. could be assigned. The listener had to press the button(s) as long as he heard, for example, a specific instrument. As long as the button was pressed down, a line was drawn on a strip of paper that moved continuously through the machine. Investigations showed that one student was able to concentrate on three parameters. When more than one student worked on the machine, a simple "aural" score could be created to indicate, for example, that the trumpet played the first theme of the piece forte, while the accompanying instruments played piano.[298]

Four forms of notation used in late twentieth-century music were distinguished by Karkoschka: precise notation using pre-specified signs, frame notation (*Rahmennotation*: within set borders options can be chosen), "alluded" *(hinweisende)* notation (no exact instructions are given), and graphs (the opposite of exact notation with the goal to stimulate and not to limit).[299] This fine distinction is, however, not made in colloquial speech, in which the whole domain is referred to as 'graphical notation'.

Graphs are often used in elementary instruction as a preliminary phase to traditional precise notation, and in secondary instruction it is a way of presenting and analysing complex music. The difference between elementary and secondary instruction lies in the amount of detail presented in the graph.

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296 Christoph Hohlfeld, **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.] pp. 7-12.

297 Erhard Karkoschka, "Eine Hörpartitur elektronischer Musik" in **Musik und Bildung**, 63/5 (May 1972) p. 221.

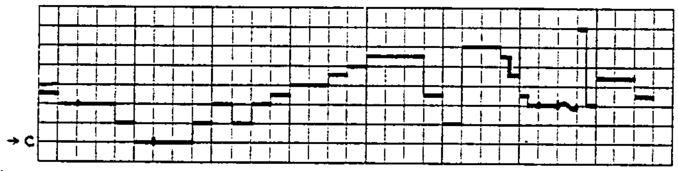
298 Theo Schläger, "Ein neues Gerät zum Erstellen von Elementarpartituren im Musikunterricht" in **Musik und Bildung,** 9 (68) (1977)/6 pp. 353-354

299 Erhard Karkoschka, **Das Schriftbild der neuen Musik.** Celle: Moeck, 1966 pp. 19, 57, 65 and 79.

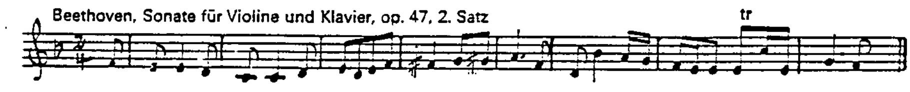
Through the application of graphical notation, students are given the opportunity to develop their own notation system, which in turn implies the conscious handling of aspects such as invention, notation, realization, indication, reading and analysis. As pointed out earlier by Brink, graphical notation offers the ability to represent all music parameters. Pratt et al. provided an example of graphical timbre dictation,[300] and Güldenstein gave an example of exact pitch and duration dictation using graphical notation:[301]

Fig. 2.16 Güldenstein: Example of graphical dictation

Graphical notation:



Traditional notation:



Since the pedagogical reform that took place in Germany in the 1920s, the practice of drawing according to what was heard has played an increasingly important role in music and art education. Oskar Rainer developed this art method in 1913, and Sündermann and Ernst systemised and developed it further. The term polyaesthetic education is used to describe the interaction between music and the arts. Similar to graphical notation, drawing can activate intense listening. This is, however, still a neglected method in public schools.[302]

Quoting Hörmann, Siegmund Helms demonstrated that the value of polyaesthetic education lies in the variety of analytical perception perspectives. It serves as a way to intensify the emotional experiences of music, and is an aid to illustrate the pivotal idea of the composition on a multi-dimensional level. This approach also has the advantage of providing no right or wrong answers, but of representing different perception perspectives.

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[300] George Pratt, Michael Henson and Simon Cargill, **Aural Awareness - Principles and Practice.** Milton Keynes: Open University Press, 1990 pp. 57-58.

[301] Gustav Güldenstein, **Gehörbildung für Musiker - Ein Lehrbuch.** Basel: Schwabe, 1971 p. 21.

[302] Siegmund Helms, "Auge und Ohr - Zur Visualisierung von Musik und Musikalisierung von Bildern" in **Musik und Unterricht**, 1/2 (May 1990) pp. 3, 5-6.

4.1.7 Transposition tasks

In these tasks, what was heard or read must be transposed into a different key, either through playing on an instrument, singing on note names, or through dictation. Apart from the "everyday-life" advantages of mastering this skill, it develops cognitive thinking. Perceptions must be analysed in order to reproduce them. Transposition often is an extension of instrumental reproduction and dictation tasks where heard material should be reproduced in the original key. When the student is then asked to transpose the passage into a different key, he has to go through the analysis process once more.[303]

Another form of transposition occurs when students have to sight read melodies or pieces written in the alto or tenor clefs, or by performing transposing orchestral instrument parts on the piano.[304]

Ieuan Rees-Davies discussed methods *not* to be recommended when developing this skill. He opposed the procedure of reading mentally calculated intervals because this method could not be applied to four-part or more complex work. He also described another complex mathematical procedure: when transposing from G/g to E/e, the second line in the treble clef is mentally considered as the bottom line, with the existing bottom line imagined as a ledger line. The same practice is applied to the spaces of the bass clef. He pointed out, however, that the only musical solution is to first hear mentally what has to be transposed, reading phrases or sentences as a whole and not note by note or chord by chord.[305]

4.1.8 Completion tasks

The principle of completion was mentioned earlier under the heading of transcription tasks. This method has the advantage of dealing with wholes in which parts are omitted. The given material supplies important information on the musical structure such as sequences, parallels etc. The provided bar lines make rhythmic orientation easier, and the teacher has a free hand to set difficulty levels. What is considered too difficult can be written out as part of the provided material.

Actual music from the music literature can be used to teach all parameters of music. In this holistic approach, details can be studied within a musical context moving beyond the musical phrase, creating the opportunity to deal with complete compositions. Several aural tasks such as transcription, verbal descriptions, improvisation, gestural tasks, etc. can be applied to fill in the musical "gaps".

Fried Weisbrod gave an example of a prepared score with missing information. The missing elements presented on a separate page are to be cut out and placed on the correct spots. This can be done with both traditional and graphical

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303 Prof. Hubert Haas in an interview with the researcher on 7 November 1988.

304 Robert D. Levin and Louis Martin, **Sight Singing and Ear Training through Literature.** Englewood Cliffs, N.J.: Prentice-Hall, 1988 pp. 444-451.

305 Ieuan Rees-Davies, **Transposition at the Keyboard.** London: J. Curwen and Sons, [n.d.] pp. 5-7.

notation.[306] Alldahl recommended that completion tasks should take the form of homework assignments. Each student has to develop his own conception of the musical structure, has to determine a reasonable amount to take down, the level of detail and the appropriate notation. Comparisons of different student versions of the same assignment, and comparisons of these with the original can be very interesting. In many cases it is not appropriate to speak of solutions as 'correct' and 'incorrect'.[307] Two examples of completion tasks presented by Irene Matz at the *6. Stuttgarter Sommerkurse 1990* appear in Appendix C.[308]

4.1.9 Discrepancy tasks

Discrepancy tasks are based on comparing instantaneously an aural conception with a visual conception in which precise information must be derived from abstract and discrete visual symbols. The ability to perform this task is of the utmost importance in musical practice because musicians constantly work with scores. Unless the reading process stimulates an internal aural conception, this reading process is unrelated to music.[309]

(a) Aligning notation and sound

Sherman and Knight provided examples of this procedure. After a short melodic phrase is heard, the student has to recognise which of the two or three given notated examples "align" with the heard example. At the beginning level students have to concentrate on only one parameter, e.g. pitches (intervals), placed within a musical context. At more advanced levels students have to concentrate on more than one parameter while aligning two-part musical phrases, including parts in the alto and tenor clefs.[310]

(b) Error detection

Two forms of error detection can be distinguished. In the first form the examples are notated correctly, while mistakes appear in the heard version. This process can be reversed in the second form where what is heard is correct, with errors appearing in the notated examples.[311]

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306 Fried Weisbrod, "Methoden der Hörerziehung und der Gehörbildung" in Wolfgang Schmidt-Brunner (Ed.), **Methoden des Musikunterricths.** Mainz: Schott, 1982 pp. 230-233.

307 Per-Gunnar Alldahl, "Teaching Music Theory: The European Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 121-122.

308 Lecture "Hören neuer Musik" read by Prof. Irene Matz at the ***6. Stuttgarter Sommerkurse 1990**, Hochschule für Musik und Darstellende Kunst Stuttgart* in 1990.

309 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 91-92.

310 Robert W. Sherman and Morris H. Knight, **Student Workbook for Aural Comprehension in Music Vols. 1 and 2.** New York: McGraw-Hill, 1972.

311 Hermann Sprenger, **Methodik der Gehörbildung**. Unpublished manuscript, [n.d.] p. 30.

On a more advanced level students are not only expected to indicate where discrepancies appeared between what was heard and seen, but also to correct mistakes. This ability to focus on the nature of change is important for the following three reasons: (a) according to research results reading errors can be categorised. By working with constructed drills students can learn to detect these errors in the performances of others, and can be on guard to avoid them in their own performances; (b) through correcting notation errors by re-notating them, the student is encouraged to "follow a notational model with regard to accurate drawing and placement of notation symbols"; (c) emphasis is placed on accuracy of reading.[312]

Regarding the complexity of "corrective listening", Marian Ruth Yeager found that such listening varied greatly with the number of voices used. Single melodic line errors were the easiest to detect and students were able to discover approximately ten per cent more errors than they were able to correct. She also found that error detection correlated highly with the ability to take dictation.[313]

(c) Comparisons between score and different recordings

As a pre-phase to evaluation tasks, taking into account all the parameters of music, differences between different recordings of the same musical work can be compared with the score. Apart from wrongly played notes, rhythms or misread dynamics, etc., nuances on the interpretational level should be observed and investigated.

4.1.10 Description tasks

> "Words are the most abstract symbols of all. As such, they require a mind capable of mentally reconstructing a performance and then describing its structure through a technical vocabulary. The cognitive demands are similar to those of advanced graphic and notational procedures."[314]

Verbal descriptions are often used as a pre-phase to other methods such as transcription tasks. This method involves the ability to analyse what was heard or what has to be reproduced instrumentally, performed through sight singing, transposed to other keys, etc. by verbally identifying and naming patterns and clichés. It is the only way to communicate a knowledge of structural relationships, and is always used in connection with the aural analysis tasks described in section 4.1.11. In combination with other Aural Training methods it can demonstrate a mature level of aural comprehension of musical structures.

The value of verbal descriptions was also stressed by Barbara Ruth Hiranpradist who attempted to determine aural problem-solving strategies of university students. She found amongst other things, that both music majors and non-

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312 Janet McLoud McGaughey, **Practical Ear Training.** Boston: Allyn and Bacon, 1966 p. 2.

313 Marian Ruth Yeager, **A survey of the corrective listening ability of a group of college music students.** Unpublished Master's thesis, University of Texas, 1952 p. 65.

314 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 p. 89.

music majors agreed that verbalizing about what was happening in the music was helpful in focused musical analysis.[315]

In the verbal description process students can use either music theory terminology or "self-created" terms, often borrowed from non-musical experiences. Wanda Teresa O'Brien compared two types of instructional language with regard to "their effect upon the formation of attitudes, their contribution to students' acquisition of aural perception and musical knowledge, and their effect on the application of attitudes and understanding to similar unstudied recorded orchestral music examples". Two seventh grade treatment groups were empirically examined. During a six week period, one group used a combination of figurative and analytical language. Similes, metaphors and analogies as well as musical terms in written materials and discussions of the expressive and structural aspects of the music were used. The second treatment group made exclusive use of analytical language in written materials and discussions of the music. Post-test results indicated that the first group, which used a combination of figurative and analytical language, scored significantly higher than the second group.[316]

4.1.11 Aural Analysis tasks

The aim of aural analysis (also referred to as *structural dictation*)[317] is to foster an understanding of bigger form schemes and musical structures, mainly through listening on a macroscopic level. Actual music is the subject of study, and not out-of-context excerpts or brief exercises composed for teaching purposes. The focus is placed on more than one parameter of music. In some cases though, one parameter can be isolated for a short while, after which it is re-integrated into the musical context. Perceptual and structural tasks should form a unity which culminates in many different aural tasks. Verbal descriptions of what was heard are the most common form of communication used in teaching practice. Christoph Richter, however, recommended that the use of music terminology should be abandoned occasionally in Aural Analysis classes in order to perceive nuances and deviations otherwise not recognised.[318]

According to Haas, analysis is a scientific method in which a whole is "de-composed" and classified in order to reveal its detectable and characteristic structure. In music analysis classes this is often done while studying the score and other sources in which comments have been made on the particular composition. Because music has been created to be listened to, a form of aural analysis in which the recognition of musical structures without consulting the score occurs should also be incorporated into Aural Training classes. It is important to note that a score-based analysis will

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315 Barbara Ruth Hiranpradist, **Formal Operational Thought as a Dimension of Music Listener Behavior.** Doctoral dissertation, Michigan State University 1986. Ann Arbor, Michigan: University Microfilms International, 1986 p. 87.

316 Wanda Teresa O'Brien, "A Comparison of the Use of Analytical Language with the Use of a Combination of Figurative and Analytical Language and their effects on attitude and Conceptual Understanding of Music among Seventh-Grade Students" in **Dissertation Abstracts International,** 50/7 (January 1990) p. 1975-A.

317 Lenore Pogonowski, "Critical Thinking and Music Listening" in **Music Educators Journal**, 76 (September 1989) pp. 36-37.

318 Christoph Richter, "Höranalyse" in **Musik und Bildung,** 11/3 (May 1979) p. 180.

differ from an aurally based analysis because the perception of time when reading a score cannot be compared with the perception of time when listening to a piece of music.[319]

Although Walter Kolneder discussed certain advantages of what he called visual analysis as opposed to aural analysis (e.g. a *Prestissimo alla breve* can be visually studied in detail in an unlimited time frame), he also questioned the predominance of its appearance in Music Education. The danger exists that the bigger relationships can get lost in the constant analysis of details, a procedure which is bound to be static. Kolneder quoted Hindemith as saying that although music is dependent on the movement of sound, music theorists tend to see it as something static that consists of a chain of individual sounds. Kolneder also supplied an example of the discrepancy between visual and aural analysis: a student analysed the first song of Anton Webern's Op. 3 and spotted a typical Neapolitan - Dominant - Tonic progression. The student continued in his written analysis that the ear now only has to identify this characteristic progression. According to Kolneder the tempo of this song is so fast and the motive played so rapidly that it is almost impossible to even vaguely identify a cadential motive. He once again quoted Hindemith who said that a true musician only believes what he hears.[320]

Whereas Mackamul recommended that aural analysis of musical form schemes and other bigger structural relationships should be studied separately from Aural Training classes,[321] Brink, Gauldin and Wittlich advocated that Aural Training should begin with broad overview tasks and gradually move to more detailed tasks.[322]

Brink based her taxonomy of aural tasks on the psychological knowledge that mental processes operate in primary and secondary stages. Because primary processes are holistic and fast, she began her outline with the consideration of the larger framework, the "overview tasks". In the next phase a middle ground level of detail is included. Phrases are examined and can be further divided into motives and figures. Phrases can, however, be combined to form bigger sections, leading to the last phase of the outline in which the whole is again considered in what is called "grouping tasks". In this third phase the large-scale structure is able to deal with more information and in greater depth than was possible in the overview tasks. Her outline can be summarised as follows:

Large-scale structure: overview;
Small-scale structure: phrase level;
Large-scale structure: grouping.

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319 Prof. Hubert Haas in an interview with the researcher on 7 November 1988.

320 Walter Kolneder, "Visuelle und Auditive Analyse" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens**. Berlin: Merseburger, 1962 pp. 58-61.

321 Roland Mackamul, "Gehörbildung - wo und wann? (II)" in **Schweizerische Musikzeitung**, 123/3 (May/June 1983) pp. 164-166.

322 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 103-111.
Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 77-78.
Gary E. Wittlich and Lee Humphries, **Ear Training - An Approach through Music Literature.** New York: Harcourt Brace Jovanovich, 1974.

Gary Wittlich compiled fourteen complete compositions, or movements from compositions, composed between the fifteenth and twentieth century, that serve as the source of a variety of questions, self-drills and dictation exercises. These were organised with the purpose of leading students to a thorough understanding of each work as a whole in terms of their musical materials and their interrelationships. At the beginning of each unit a brief historical-stylistic introduction is given, after which the working procedure is divided into three sections: answering general questions by listening only, performing simpler to more difficult drills taken from the work, and dictation and analysis.

Examples of the simplest forms of Aural Analysis were given by Haas and Benward in which relationships between phrases, sequences and rhythmic repetitions should be recognised.[323] Quoting Eicke, Jan Haspeslagh warned against the reduction of music to standard form schemes such as ABA. In the same way as 'car light left, car light right, radiator in the middle' does not fully describe the front side of a motor car, ABA does not say much about the inner structure of music.[324] Haas pointed out that deviations from the norm are more interesting and more realistic. He therefore compared for one semester Minuets by W.A. Mozart with one another in his Aural Analysis classes at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart.* Based on the same idea, Rainer Wehinger compared the Exposition, Development and Recapitulation sections of Mozart piano sonatas with one another in a series of Aural Analysis classes at the same Hochschule.[325] Pütz reported that Aural Analysis classes at the *Folkwang Hochschule Essen* concentrated on six areas:

(a) Recognition of bigger form schemes.
(b) Recognition and description of the characteristic attributes of different styles and style periods.
(c) Aural concentration on certain aspects.
(d) Aural concentration on certain form schemes.
(e) Recognition of different composition practices.
(f) Detail exercises.[326]

Aural Analysis forms part of the British G.S.E. examinations in that students are expected to analyse a twelve-to-eighteen-bar piece heard at least seven times. Students have to answer questions that relate to instrumentation, form, key-changes, expression marks, dynamic changes, rhythm employed, suitable tempi indications using conventional Italian terms, style or period, suitable title (e.g. March, Minuet, etc.), cadences, unusual features (e.g. cross-rhythms, change of time-signature, etc.), sequential repetition and pedal points.[327]

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323 Bruce Benward, **Workbook in Advanced Ear Training.** Dubuque, Iowa: Wm.C. Brown, 1961 pp. 7 and 16.
Prof. Hubert Haas in an interview with the researcher on 7 November 1988.

324 Jan Haspeslagh, "Algemene muziekopvoeding als auditive waarnemingsopvoeding (1)" in **Adem** 24/5 (1988) p. 88.

325 Classes were attended by the researcher at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart* between 1989-1991.
An example of an Aural Analysis class taught at this Hochschule, as well as a student's seminar on this subject at the same institute, are presented in Appendix D.

326 Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung,** 63/5 (May 1972) p. 234.

327 Michael Illman, **Systematic Aural Training - Teacher's book.** London: Longman, 1974 p. 152.

An example of an aural analysis project to be accomplished in two class periods was provided by Gary Potter. The Jazz piece *Django* (approx. 5½ minutes) by John Lewis, has to be analysed aurally with the help of a listening guide. Listening to the whole piece several times before answering more detailed questions is strongly emphasised. Different skills such as singing, keyboard work, analysis, dictation, composition and improvisation are integrated. Jazz terminology and chord symbols, model progressions (e.g. circle of fifths to half cadence, 'bass riff' - Blues-related cadence pattern) are introduced before detailed work is started.[328]

4.1.12 Creative tasks

The ability to create a musical piece or phrase by applying knowledge in such a way that a new entity is conceptualised requires a high level of cognitive thinking. Creation can take place by altering or elaborating given ideas (improvisation) or by inventing something new (composition). These tasks seldom appear in Aural Training classes and when they do the emphasis is placed on improvisation. As the use of composition as a way of teaching comprehensive Aural Training is discussed in detail in Chapter Four, this discussion will concentrate on improvisation.

Hermann Grabner recommended that students improvise basic rhythmic figures such as iambic, anapaestic, trochee, etc. on given melodic models:[329]

Fig. 2.17 Grabner: Example of rhythmic improvisation on a given melodic model

Model:

Iambic variation:

Concerning melodic improvisation DeLone suggested that, as an outgrowth of singing from sight recitatives with chordal accompaniments, students should improvise a new line against the given accompaniment.[330] Basically the same idea was suggested by Gould in that students should improvise a tune within given harmonic and time boundaries.[331] A variation of this principle was applied in the 'scanning' exercises developed by Trubitt and Hines. Apart from fostering improvisation skills, this exercise was also developed to help train the eye to read ahead, an ability necessary in all reading tasks. The general contour of the melody to be improvised vocally is shown between

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328 Gary Potter, "Putting Aural Skills to Work: An Aural Analysis Project" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 69-84.

329 Hermann Grabner, **Neue Gehörübung.** Berlin: Max Hesses, 1962 pp. 13-14.

330 Richard P. DeLone, **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981 p. 273.

331 Murray J. Gould, **Paths to Musical Thought - An Approach to Ear Training through Sight Singing.** New York: Holt, Rinehart and Winston, 1979 p. 72.

two horizontal lines which represent the top and bottom lines of the musical stave. The rise and fall of the tones are indicated and the exact pitches to be sung depend on the student:[332]

Fig. 2.18 Trubitt and Hines: Example of improvisation based on given contour lines and exact rhythms

In an article called *Creative Sightsinging*, H. Lee Riggins and Howard Irving applied improvisation practices to folk melodies:

(a) The melody should first be sung several times in unison.
(b) The melody might be sung against one or more ostinato figures derived from motives of the melody.
(c) The melody can also be sung in canon against the continuing ostinati.
(d) A countermelody can be sung against the original melody.[333]

The changing of melodies, either vocally or instrumentally, by means of figurations and decorations, as well as improvising a melody to a given ostinato, was recommended by Brühl.[334] Harmonic accompaniments can also be performed to already existing melodies.

There are legions of possibilities of incorporating improvisation tasks into Aural Training. It can be also successfully combined with other tasks such as, for example, completion tasks.

4.1.13 Evaluation tasks

The primary aim of this method is to apply critical judgment to musical observations (actively listening), performances and compositions. This can take place in the form of self-criticism, of criticising the work of other musicians, and/or by being a "professional" music critic. All evaluation tasks in music have an aural dimension to them. Without the ability to evaluate what was heard no intelligent listening, performing, teaching or composing can take place.

According to Bloom et al. the ability to evaluate forms the highest level of cognitive thinking.[335] Four evaluation levels were distinguished by Pratt et al. The first level consists of little more than announcements that events have

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[332] Allen R. Trubitt and Robert S. Hines, **Ear Training and Sight-Singing: An Integrated Approach, Book I.** New York: Schirmer Books, 1979 pp. 15-16.

[333] H. Lee Riggins and Howard Irving, "Creative Sightsinging" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) p. 86.

[334] Karl W. Brühl, **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978 pp. 79-82.

[335] Krathwohl, Bloom and Masia, **Taxonomy of Educational Objectives - The Classification of Education Goals, Handbook II.** New York: David McKay, 1964 pp. 186-193.

taken place. On the next level subjective words such as 'beautiful' or 'sensitive' are used without any supporting reasons for the judgement. A higher level is achieved when criticism is supported with clear implications of the criteria on which the judgments are based. On the fourth, highest, level of criticism the criteria for judgment are determined, the performance/composition is measured against them, and any influencing factors outside the music are also referred to. Taking into account these levels, the authors determined five 'functions' of criticism:

(a) Analyzing the elements which constitute a given 'span of music';
(b) Exploring ways in which these elements act alone and interact with each other;
(c) Synthesizing these actions and interactions into musical 'effects' (e.g. tension and release);
(d) Establishing the desirability of these effects, measured against historical facts and stylistic usages;
(e) Recognizing and compensating for factors that could influence the evaluation procedures or make judgments unreliable: for example, familiarity with a work or style, knowledge of historical factors affecting the quality of the sound (e.g. original Baroque instruments as compared with sound and bowing techniques of modern instruments), knowledge of instrumental techniques, 'cueing' (views of other people may colour a musician's own opinions), emotional state, and the context of the performance (a better performance within the context of other bad performances can appear to be disproportionally good.[336]

4.2 Programmed instruction

The field of programmed instruction (often referred to as auto-instruction, machine teaching, self-instruction or automated instruction) is a **twentieth-century phenomenon**, first found in Pressey's automatic testing machine in the early 1920s. Since B.F. Skinner wrote an article on the implications of programmed instruction for educational purposes in 1954, James D. Finn and Donald G. Perrin reported in 1962 that within about ten years over 80 teaching machines and nearly 300 programs for general educational use had been developed.[337] The escalation of the significance of programmed instruction in the field of music is well demonstrated in the list of more than a hundred different Computer Aural Training programs that appears in Appendix E. This is not to mention the programs in other music education branches such as written music theory and composition.

Originally meant as a form of **self-instruction**, the term programmed instruction is used when students study on their own, utilising merely textbooks, cassettes and/or computer programs. Applications of Skinner's learning theory to programmed instruction lead to the following early requirements and characteristics, some of which are still valid today:

(a) A logical series of small steps of subject matter should be presented at such a pace that will guarantee success on the part of the pupil.
(b) Students have to respond actively to each of the steps.
(c) Immediate knowledge of the accuracy of students' responses is provided.
(d) Students can work at their own pace.[338]

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336 George Pratt, Michael Henson and Simon Cargill, **Aural Awareness - Principles and Practice.** Milton Keynes: Open University Press, 1990 pp. 68-70.

337 James C. Carlsen, "Programed Learning in Melodic Dictation" in **Journal of Research in Music Education**, 12/2 (1964) p. 139.

338 Derek Blease, **Evaluating Education Software**. London: Croom Helm, 1986 p. 23.

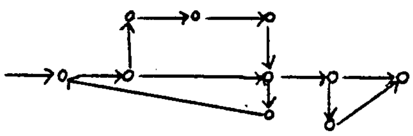
In the beginning stages of self-instruction the *programmed textbook* was very popular and the "scrambled-textbook approach" in which the order of learning depended on the quality of the answer, drew a lot of attention. Students had to be careful to follow direct instructions as to the correct exclusion of material.

Skinner and Crowder distinguished between the linear and branching organising structures of programs. In the first structure only one answer can be given in order to continue with the program and steps are presented in a fixed sequence. The second structure differs from the first in that further path sequences can be formed through the answering of multiple choice questions. Branching programs also allow for so-called 'remedial loops', enabling the studying of problem sections more than once.[339] Erna Woll used the following diagrams to explain the difference:[340]

Fig. 2.19 Examples of linear and branching structures in programmed instruction

The four phases of linear organisation: (a) information, (b) question or assignment, (c) student's answer, (d) correct answer or reinforcement of success:

Branching structures in which explanatory steps follow a wrong answer:



Techniques used in foreign-language laboratories were combined with textbook approaches in the first music programs.[341] One of the earliest experiments utilising musical examples recorded on magnetic tape for self-drill purposes, was conducted by Frank R. Cookson at Northwestern University in 1949.[342]

Two major developmental stages of programmed aural instruction can be determined, namely *Non-computer-assisted programmed Aural Training (NCAT,* utilising reel-to-reel tape recorders, cassette recorders, records,

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339 Bernd Enders, "Lehr- und Lernprogramme in der Musik" in Helmut Schaffrath (Ed.), **Computer in der Musik.** Stuttgart: J.B. Metzler, 1991 p. 106.
Derek Blease, **Evaluating Education Software.** London: Croom Helm, 1986 p. 23.

340 Erna Woll, **Buchprogrammiertes Musiklernen.** Wolfenbüttel: Möseler, 1970 p. 8.

341 Wolfgang E. Kuhn and Raynold L. Allvin, "Computer-Assisted Teaching: A New Approach to Research in Music" in **Journal of Research in Music Education,** 15/4 (1967) p. 305.

342 James C. Carlsen, "Programed Learning in Melodic Dictation" in **Journal of Research in Music Education,** 12/2 (1964) p. 140.

teaching machines), and *Computer-assisted Aural Training (CAT)*.[343] Textbooks were and often still are used in combination with the programs. Although CAT is gaining more ground and is the more progressive of the two (NCAT can be seen as a forerunner), NCAT is still used in certain education circles. Both forms are discussed in more detail in Sections 4.2.1 and 4.2.2.

Several authors addressed the **advantages** of programmed instruction. Kral and Zopf pointed out that programmed teaching can avoid certain circumstances that can block the learning process:

- Psychological stress that comes from being observed (teacher, other students in class) and from the pressure of achievement and lack of success.
- Disappointment because of varying learning progress of fellow students despite differentiation.
- Variance of individual student's motivation because of the teacher.
- The fixed time schedule and duration of instruction does not take into account the psychological condition, concentration capacity and fatigue level of the student.
- Negligence on the part of the student to ask the teacher questions, because of fear to make known his lack of knowledge or skills.
- The learning tempo set for each grade does not leave time for eliminating deficiencies which is a requirement for learning growth in Aural Training.
- The possibility of immediately transferring aural impressions to the student's own instrument does not usually exist in classroom-based instruction.[344]

The authors furthermore maintained that their programmed instruction aimed to lead a student to discover his own aural perception "type" (*Typus*). Also referring to the fact that achievement depends on the psychological disposition of the student, Kühn saw the traditional examination practice of evaluating only a momentary achievement as a "misanthropic absurdity".[345] Programmed instruction and especially computer-assisted instruction includes the ability to keep a constant record of students' progress. A further characteristic of programmed instruction was underlined by both Jeffrey Evans and Fred Hofstetter, namely infinite patience.[346] The user is also practically forced to take part in

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343 The term CAI was first used in 1960 and originally referred to Computer-assisted instruction that consisted of a simple repetitive drill program, offering no real feedback on improvement. In the later developed CBE (Computer-Based Education), this early use of CAI was combined with Computer-Managed Instruction (CMI) in order to produce programs that offered drill exercises and reported on student progress. The instruction could be changed to fit the student's needs. Computer-Based Music Instruction (CBMI) is an application of CBE to music. The terms CBME (Computer-Based Music Education) and CAMI (Computer-Aided Music Instruction) are also used.
The description ***Computer-assisted programmed Aural Training** (CAT)* invented by the researcher refers to both CBMI and other computer applications to Aural Training.
G. David Peters, "Teacher Training and High Technology: What involvement should teachers have in computer learning?" in **Music Educators Journal**, 70/5 (1984) p. 36.
Bernd Enders, "Lehr- und Lernprogramme in der Musik" in: Helmut Schaffrath (Ed.), **Computer in der Musik**. Stuttgart: J.B. Metzler, 1991 p. 107.

344 Walter Kral and Ivo Zopf, **Gehörbildung - Lehrgang für individuelles Selbststudium Band 1.** Vienna: Österreichischer Bundesverlag, 1989 p. 8.

345 Clemens Kühn, **Gehörbildung im Selbststudium**. Kassel: Bärenreiter, 1983 p. 9.

346 Jeffrey Evans, **Practica Musica - Interactive Instruction in Music Theory and Ear Training.** Santa Barbara: Ars Nova Software, 1987.
Fred T. Hofstetter, **The GUIDO Music Learning System: Ear-Training Lessons IBM PC Version 2.1 - Student Guide.** Delaware: University of Delaware, 1989 p. 1.

the learning process and consciously knows that his success depends on his participation.[347] To this list of advantages the flexible inclusion of timbres other than the piano should also be added.

Apart from the general characteristics that both NCAT and CAT share, CAT offers an even broader spectrum of advantages over NCAT. Although a well-organised series of taped exercises can provide for more variation in students' music dictation abilities (e.g. regarding timbre), students are, however, restricted to a set number and sequence of exercises. No differentiation is made between the achievements of the students who all have to take dictation using the same exercises and often the same number of them in the same order. Students are also in most cases responsible for correcting their answers after they have completed a whole series of exercises. This has the effect that students inevitably practise their own errors if no immediate reinforcement of correct answers and diagnostic feedback is provided.[348] Authors such as Ann K. Blombach and Raynold L. Allvin saw a possible solution to this problem in the application of CAT where error analysis is possible and can act as a positive factor in the guidance of each instruction sequence. By means of branching techniques a computer program can compare a student's response with thirty or more possible answers and make the necessary branching modifications in less than a second. The student's response can also be compared to criteria that are automatically adjusted to individual differences among students. Through this, individualised paths of instruction are provided.[349]

Wittlich et al. also stated that computer-assisted instruction permits individualization, self-pacing and interaction.[350] In comparison to a textbook learning approach where information often appears in a fixed form of text and notation, Bernd Enders pointed out that through the use of computer programs information can be made even more interesting by using animated figures moving in combination with certain sounds. This multi-media apparatus (the computer) can to a certain extent be compared with a complete media package consisting of a textbook, cassette tape player and video machine.[351]

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347 Bernd Enders, "Lehr- und Lernprogramme in der Musik" in Helmut Schaffrath (Ed.), **Computer in der Musik.** Stuttgart: J.B. Metzler, 1991 p. 127.

348 Ann K. Blombach, "OSU's GAMUT: Semi-intelligent Computer-assisted Music Ear Training" at the **Sixth International Conference on Computers and the Humanities 1983.** Rockville, MD: Computer Science Press, 1983 p. 14.

349 Raynold L. Allvin, "Computer-Assisted Music Instruction: A Look at the Potential" in **Journal of Research in Music Education,** 19/2 (1971) pp. 132-133.
Robert W. Placek, "A Model for Integrating Computer-Assisted Instruction into the Music Curriculum" in **Journal of Computer-Based Instruction,** 6/3 (1980) p. 99.

350 Gary E. Wittlich, John W. Schaffer and Larry R. Babb, **Microcomputers and Music.** Englewood Cliffs, New Jersey: Prentice-Hall, 1986 p. 74.

351 Christoph Rocholl and Ullrich Eichner, "Musiklernen mit dem Computer" (interview with Bernd Enders) in **Instrumentenbau-Zeitschrift - Musik international,** 43 (July-August 1989) p. 36.

Against this background, the **main purpose of programmed Aural Training** is to provide the student with the possibility of additional training of the ear alongside classroom-based instruction.[352] As the majority of programs and computer software concentrates on rudimentary Aural Training, programmers argue that valuable classroom instruction time can be saved when students can learn the basics or do remedial work outside the classroom.[353] Hereby more advanced or creative instruction can take place during class, enabling the teacher to increase the depth and quality of his instruction.[354] The relevance of aural skills to music literature and its performance and understanding can be demonstrated during classroom instruction, and the student's competence furthered through programmed instruction modelled on the curriculum explored in the classroom.[355]

Due to the nature of Aural Training, the student is confronted with the problem of finding a suitable practice partner for outside classroom learning. As can be seen in the majority of methods described in section 4.1, students often have to act upon what was heard, thus needing somebody or something to provide the sound source. In a review on David L. Burge's *The Relative Pitch Ear-Training Course* which was modelled on the Grade and Diploma tests of the *Associated Board of the Royal Schools of Music*, it was pointed out that the ideal situation would have been to study over a period of time with a pianist, something which is not always possible.[356] Programmed instruction can fill this need for a practice partner and can provide for other timbres than just what the piano can produce.

Roger Foltz and Dorothy Gross underlined the fact that computer-assisted instruction is not intended to replace people and that it can only be a partial substitute for limited instructional time by, for example, replacing three one-hour classroom sessions with two classroom and one computer session.[357]

The fear that programmed instruction, and more specifically computers and technology, will replace musicians has been mentioned by some teachers. Especially in the field of computer-assisted instruction, the initial reaction of many teachers has been the fear that their jobs can be taken over by a machine.

> "Very often this fear emanates from the mistaken belief that computers are, in some way, intelligent and able to do anything at the touch of a button, a view encouraged and perpetuated by popular science fiction.

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352 Ned C. Deihl and Rudolf E. Radocy, "Computer-Assisted Instruction: Potential for Instrumental Music Education" in **Bulletin of the Council for Research in Music Education**, 15 (Winter 1969) p. 3.
Barton K. Bartle, **Computer Software in Music and Music Education: A Guide.** London: Scarecrow, 1987 p. vi.

353 Karl Schnürl, "Programmierte Gehörbildung im Musiksprachlabor" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976**. Regensburg: Gustav Bosse, 1977 p. 39.

354 James C. Carlsen, "Implications of Recent Research Problems in Programed Music Instruction" in **Bulletin of the Council for Research in Music Education**, 4 (Winter 1965) p. 35.

355 Robert W. Ottman, Rosemary N. Killam, Robert M. Adams, W. Kenton Bales, Steven V. Bertsche, Leslie C. Gay, Donald A. Peak and Douglas Ray, "Development of a Concept-Centered Ear-Training CAI System" in **Journal of Computer-Based Instruction**, 6/3 (1980) p. 76.

356 Review by "JS", "David L. Burge: *The Relative Pitch Ear-Training Course*" in **Guitar Player**, 22 (March 1988) p. 149.

357 Roger E. Foltz and Dorothy Gross, "Integration of CAI into a Music Program" in **Computer-Based Instruction**, 6/3 (1980) pp. 74-75.

However, after just a little experience of the school computer, it is quite a disappointment to learn just how carefully program instructions must be spelled out to get it to perform the simplest of tasks."[358]

This fear probably also has its roots in the fact that during the first stages of computer-assisted instruction some researchers believed that the teacher-shortage problem, and the general teaching crisis, could be solved with the application of the computer. As Enders put it, this is a naïve idea that is nowadays "smiled upon".[359] Only a small minority of authors maintained that the computer is not merely a substitute for a human teacher, but that it is in many ways better because it never introduces any emotive stress. The design and organisation of the aural training programs, however, depend upon the creativity and judgment of the teachers involved.[360]

"There is no doubt that there will be changes and perhaps even more dislocations. But technology phobia misses the point that technology is our *handmaiden*. It serves us, so that our creative limits can be further expanded. With technology we have new sets of tools which can save us time, bring delight to students, enrich our teaching, enlarge creative possibilities and increase accessibility to music-making capability."[361]

The crucial question to be asked is not whether programmed instruction will substitute classroom-based instruction, but whether the **teaching philosophy** advocated by the majority of Aural Training books will eventually result in such a substitute as a solution. Because of the fact that programmed instruction aims to correlate, support and reinforce the student's classroom experience, the teaching philosophy of the programmer will influence the inner structure and contents of the program.

The first roots of programmed instruction lie in the Behaviourist view of learning. It is a well-known fact that the initiators of programmed instruction, Skinner and Crowder, were supporters of the Behaviourist school of thinking, believing that a human being is formed by environmental influences, and that through drill and repetition correct responses to certain problems could be given. Skinner's learning machine was designed in such a way that students only had to answer *yes* or *no* to isolated questions.[362] As a result, many aspects of programmed teaching in both general education and music education were and still are dominated by the Behaviouristic learning theory.

Criticism of programmed instruction should start by examining the teaching/learning philosophy on which most NCAT and CAT are based. From a Behaviourist point of view, drill and practice can be performed successfully by using either tapes or computer software. It is only by banishing Behaviourism from Aural Training that monstrosities such as the view that "Because aural skills are tedious and mechanical to teach, computers have been used to aid in

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358 Derek Blease, **Evaluating Education Software**. London: Croom Helm, 1986 p. 8.

359 Bernd Enders, "Lehr- und Lernprogramme in der Musik" in Helmut Schaffrath (Ed.), **Computer in der Musik**. Stuttgart: J.B. Metzler, 1991 p. 107.

360 M.R. Lamb and R.H.T Bates, "Computerized Aural Training: An Interactive System Designed to Help Both Teachers and Students" in **Journal of Computer-Based Instruction**, 5/1-2 (1978) pp. 36-37.

361 David Tomatz, "Technology in Music: Cultural, Artistic and Ethical Implications" in **Proceedings of the National Association of Schools of Music**, 77 (1988) p. 68.

362 Bernd Goltermann, "Computerunterstützte Lernprogramme - Sackgasse oder Beschleunigungsspur für die Musikpädagogik?" in **Das Musikinstrument**, 38/5 (May 1989) p. 33.

the teaching"[363] will disappear. Another example of this thinking can be seen in Raynold L. Allvin's development of an *Automated Music Learning Center* in which aural skills can, amongst other things, be studied under computer management. According to Allvin, this would give the teacher and students time to devote their full classroom time to the development of musical taste, style and creativity. It is, however, clear that he does not see aesthetic discrimination as one of the goals of Aural Training, for he suggested that the computer should, apart from sight singing, take over all aspects of Aural Training.[364]

As already described in section 2.2, the Cognitive School of thinking opposed the Behaviourist drill and repetition approach. Influenced by the teachings of Jean Piaget, Seymour Papert developed a computer programming language for children called *LOGO* which he claimed was based on innovative learning. Criticising much of computer programming as "child programming" instead of the computer programmed by the child, Papert maintained that the most versatile, stimulating and useful programs are those which lead children to explore a variety of situations and solutions to problems. According to Malone, challenge, fantasy and curiosity make the instructional environment interesting.[365]

Although Aural Training, whether classroom-based or programmed instruction, suffers from fragmentation and isolation, drill and repetition, the seeds of a more creative cognitively-based programming in music education can be observed. Jeanne Bamberger, for example, created a music learning environment with *LOGO* in which 'tuneblocks' could be put together to make musical phrases, thus promoting the understanding of the student's ability to "control and respond to pitch relationships, the interaction between pitch and duration, and to observe how melodies are structured in a more complex design."[366] Examples of the drill of isolated music parameters as they appear in programmed Aural Training, as well as newer cognitively-based trends, are discussed in sections 4.2.1 and 4.2.2.

Finally, as to the success of programmed instruction, five different types of programmed aural instruction were investigated:

(a) Effectiveness of programmed instruction
(b) Comparisons between classroom-based and programmed instruction
(c) Comparisons between NCAT and CAT
(d) Student's attitudes towards programmed instruction
(e) Integration into the music curriculum.

When interpreting the outcome of these investigations, it should be kept in mind that the results of all investigations are related to the specific programs used and the Aural Training philosophy of the examiner(s).

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363 M.R. Lamb and R.H.T Bates, "Computerized Aural Training: An Interactive System Designed to Help Both Teachers and Students" in **Journal of Computer-Based Instruction**, 5/1-2 (1978) p. 30.

364 Raynold L. Allvin, "Do Colleges and Universities need an Automated Music Learning Center?" in **Bulletin of the Council for Research in Music Education**, 21/2 (1970) pp. 32, 35 and 44.

365 Derek Blease, **Evaluating Education Software**. London: Croom Helm, 1986 p. 27, 29.

366 Barbara H. Conant, **A Study of Cognitive Processes of Children Creating Music in a Computer Learning Environment.** Doctoral dissertation, University of Massachusetts 1988. Ann Arbor, Michigan: University Microfilms International, 1988 pp. 30-31.

Regarding the effectiveness of both NCAT and CAT, based on students' achievements, the majority of research projects reported positively on programmed instruction,[367] a fact that was also confirmed by Lois Annette Hesser after she reviewed literature on computer-assisted instruction.[368] Edward A. Tarratus and Charles L. Spohn, for example, investigated the value of taped interval discrimination and found that (a) classroom-based melodic Aural Training progressed at a faster rate due to out-of-class programmed interval drills, and (b) more classroom time was available for other work. The improvement in interval learning was statistically significant even with small groups, and the authors concluded that the college freshmen at Northwestern State College were able to learn intervals by using programmed taped drills.[369]

The majority of comparative studies between classroom-based and programmed instruction also reported in favour of programmed instruction.[370] Using a comparative pre-test post-test approach, Michael Arenson found CAI superior to more traditional homework assignments in learning music fundamentals. Both the control and experimental groups received classroom-based instruction with homework done either in the form of assignments to be drilled by the student at home, or drill in the form of computer-based instruction. There is, however, also evidence of neutral outcomes at, for example, the *Hochschule für Musik und Theater Hannover*, where no significant difference was found between a group of freshmen receiving classroom-based instruction, a group of freshmen receiving CAT and a group of students in their seventh semester who received only classroom-based aural instruction. Broad trends could nevertheless be observed: all groups showed a significant increase between the pre- and post-tests. Students who

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367 Nancy Marie Bodenstein, "The Teaching of Selected Musical Concepts in the College Music Survey Course utilizing the Taped Guided Listening Method" in **Dissertation Abstracts International**, 36/3 (September 1975) p. 1363-A.
Nicholas Bridges, "The Development of Aural Perception of Selected Percepts of Musical Form utilizing Programmed Instruction" in **Dissertation Abstracts International**, 43/4 (October 1982) pp. 1073-A - 1074-A.
Robert Clinton Parker, "The Relative Effectiveness of the TAP System Instruction in Sight Singing: An Experimental Study" in **Dissertation Abstracts International**, 41/1 (July 1980) p. 151-A.
Mark Allen Goodwin, "The Effectiveness of 'Pitch Master' compared to Traditional Classroom Methods in Teaching Sightsinging to College Music Students" in **Dissertation Abstracts International**, 52/1 (July 1991) p. 106-A.
Melvin Lucas Daniels, "An Investigation of the Effectiveness of Programed Learning in the Teaching of Harmonic Dictation in a Beginning College Music Theory Course" in **Dissertation Abstracts International**, 26/11 (May 1966) pp. 6544-A - 6545.-A.
Bruce Foreman Dalby, "A Computer-based Training Program for the Development of Harmonic Intonation Discrimination Skill" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1974-A - 1975-A.
Mark Joseph Eisele, "Development and Validation of a Computer-assisted Instructional Lesson for Teaching Intonation Discrimination Skills to Violin and Viola Students" in **Dissertation Abstracts International**, 46/12 (June 1986) p. 3642-A.

368 Lois Annette Hesser, **Effectiveness of Computer-Assisted Instruction in Developing Music Reading Skills at the Elementary Level.** Doctoral dissertation, State University of New York at Albany 1988. Ann Arbor, Michigan: University Microfilms International, 1988 pp. 49-58.

369 Edward A. Tarratus and Charles L. Spohn, "Cooperative Research in Programed Learning: Taped Interval Discrimination Drills" in **Journal of Research in Music Education,** 15/3 (1967) p. 215.

370 James Avery Humphries, "The Effects of Computer-Assisted Aural Drill Time on Achievement in Musical Interval Identification" in **Journal of Computer-Based Instruction**, 6/3 (1980) pp. 91-98.

scored under average showed greater increases in achievement than those who scored above average. The results were, however, influenced by inconsistent attendance on the part of some students who received CAT.[371]

Not all studies reported neutrally or positively on the effectiveness of CAT in comparison to the traditional approach. Results from Don Wayne Shannon's investigation indicated that the CAI approach was not as effective as the traditional approach, and that the two groups did not differ in the degree of positive or negative attitudes towards the two approaches. He concluded that human interaction may be the reason for the effectiveness of a traditional approach, and that students may feel that isolated drills are irrelevant to their musical interests.[372]

Comparative investigations between NCAT and CAT proved CAT to be significantly better than NCAT.[373] Canelos et al., for example, examined the learning of intervals for beginner music majors, by comparing the effectiveness of linear programmed text, CAT and self-practice using the textbook study approach with one another. CAT proved to be significantly better and the self-practice method the least effective, because students had to make their own decisions as to the relevance of the material to be learned. Edgar Joseph Thompson also discovered that computer instruction in sight singing was preferred to a cassette-based program or classroom-based instruction. The latter was, however, favoured over a cassette-based program. Students using CAT also scored significantly better than students who received no computer instruction over the same time period. Student attitudes were positive towards the computer although they seemed to mellow later, a 'wearing off of the novelty'.[374]

Students' attitudes have been addressed in some of the abovementioned studies. Randall G. Pembrook specifically investigated this aspect of programmed instruction and started his investigation by referring to four different studies (Kuhn 1974, Placek, 1974, Hofstetter 1979, Rushinek, Rushinek and Stutz 1981) in which students expressed positive feelings towards CAI.

Pembrook, however, then demonstrated that not all people were fascinated by CAI. He quoted Fischer (1982) who stated that much electronic courseware was simplistic and did not exploit the full teaching power of the computer because of little interest on the part of good teachers to publish their instruction materials as software. Individuals

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371 Michael Arenson, "The Effect of a Competency-Based Computer Program on the Learning of Fundamental Skills in a Music Theory Course for Non-Majors" in **Journal of Computer-Based Instruction**, 9/2 (1982) pp. 55-58.
Christoph Hempel and Andreas Lehmann, **TELG - Testreihe zur Ermittlung von Lernfortschritten in der Gehörbildung.** Pre-publication copy of the authors' contribution to a panel discussion during the *KlangArt-KonGreß* held at the University of Osnabrück in 1991.

372 Don Wayne Shannon, "Aural-Visual Interval Recognition in Music Instruction: a Comparison of a Computer-Assisted Approach and a Traditional In-class Approach" in **Dissertation Abstracts International**, 43/3 (September 1982) p. 718-A.

373 Janet Claire Garton, "The Efficacy of Computer-based and Tape-recorded Assistance in Second-semester Freshman Ear-training Instruction" in **Dissertation Abstracts International**, 42/11 (May 1982 p. 4757-A.

374 James J. Canelos, Barbara A. Murphy, Ann K. Blombach and William C. Heck, "Evaluation of Three Types of Instructional Strategy for Learner Acquisition of Intervals" in **Journal of Research in Music Education** 28/4 (1980) p. 243.
Edgar Joseph Thompson, "Sightsinging Constant Rhythm Pitch Phrases: A Computer-Assisted Instructional System" in **Dissertation Abstracts International**, 34/7 (January 1974) p. 4319-A.

who were interested in publishing materials were discouraged by marketing trends in which software had to be developed quickly, marketed successfully, and consequently become profitable.

Against this background, Pembrook surveyed students' attitude towards the equipment, software and grading policies of the MEDICI melodic dictation program used at the Florida State University, by using a questionnaire. The subjects of this study were students who experienced both classroom-based and computer-based instruction. The outcome of his investigation revealed that students in general did not have a favourable view of the program, and that the majority complained, for example, about (a) the touch-sensitive screen in which a different response was read by the computer if students were slightly off with their touches, (b) discomfort using headphones, (c) the huge amount of time spend on CAT which included an X number of dictation exercises per week, and (d) the timbre of sound used. Only 20% indicated that they enjoyed working with MEDICI, while 86% stated that they enjoyed classroom-based instruction. Interestingly enough a small minority of 16% indicated that 'Ear Training' was overemphasised at their university. A possible reason for this could be that students thought that other instruction areas were being ignored.[375]

Using qualitative methodology, Liora Bresler examined the role that the computer played in the music curriculum. Apart from determining certain advantages of the computer on the learning of some students (development of self-diagnosing learning difficulties, analytical thinking, systematic working habits and long concentration span), she found that the availability of the computer had no impact on the curriculum in the class, neither on the goals or contents nor on the format. Teachers' barriers, such as reluctance on the part of the teacher to review his goals, and hesitation to relinquish his position of authority, hindered the integration of the computer into the curriculum. Students' barriers included the lack of "on-line" guidance, poor sound quality, the presentation of isolated musical elements, a discouraging grading system on the computer, and system software bugs.[376]

In the light of Bresler's investigation, D.L. Hattingh's reservations about the importance of programmed instruction in general education can also to a certain extent be applied to Music Education:

(a) Programmed instruction can never completely replace the teacher. It may at most function alongside the teacher, or in an integrated way between the teacher and pupils.
(b) The place of programmed instruction should be indicated by a didactic theory. Place allocation does not imply that a theory should be constructed around a program.
(c) The obtaining of insight into a certain matter should be handled by the living teacher himself.
(d) Lessons in which the disposition of feelings play a large role are inter-subjective or personal matters which do not fall into the field of programmed instruction.
(e) Subjects which reveal a closed system or closed logics are suitable for programming.
(f) Education which aims to develop creativity is generally not programmable.[377]
(g) Programmed instruction may be successfully applied in combination with other learning aids and teaching methods. It could, for example, have a homework function.

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[375] Randall G. Pembrook, "Some Implications of Students' Attitudes Toward a Computer-Based Melodic Dictation Program" in **Journal of Research in Music Education**, 34/2 (1986) pp. 121-133.

[376] Liora Bresler, "The Role of the Computer in a Music Theory Classroom: Integration, Barriers, and Learning" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1689-A.

[377] The latest software trends in the field of music composition, however, prove that aspects of creativity can be included in programmed instruction.

(h) Technical routine action and memorization acts appeared suitable for programming.[378]

The above concerns can be summarised by expressing the conviction that educational programming should in the first place put emphasis on the educational issues and not on programming.[379] There is therefore a need for teachers to reconsider their teaching philosophy and goals of Aural Training in order to develop their ability to select suitable programs. User-friendliness and clear instructions can be very helpful, but only if the contents of the program meet the set educational requirements.

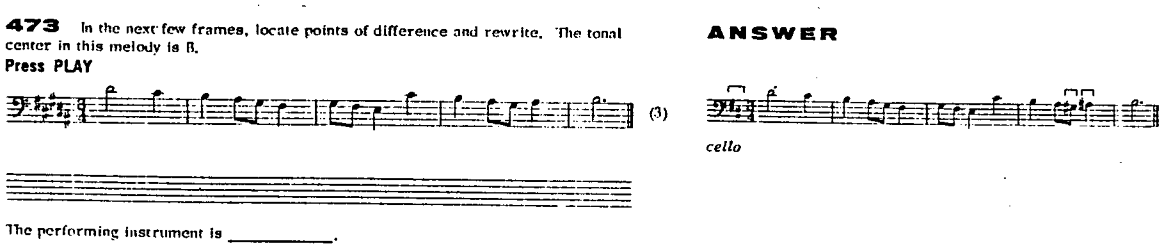
> "It is generally agreed that, in the initial flush of enthusiasm for educational computing, a great deal of poor software was produced. Although there are now many good programs on the market, too few are adequately tried in classrooms before they are published."[380]

4.2.1 Non-computer-assisted programmed Aural Training (NCAT)

The beginning phases of programmed aural instruction were characterised by the use of workbooks in combination with reel-to-reel tapes, records and teaching machines. These were later replaced by cassette tape recorders and more modern teaching apparatuses.

One of the earliest commercially available reel-to-reel tape programmed Aural Training courses was developed by James C. Carlsen in 1965. The program included the dictation of rhythmic patterns and melodies, error detection and correction, as well as instrumental identification (timbre recognition). The difficulty level was systematically increased by ordering the material into 570 'frames' (assignments). Other methods such as singing and conducting were recommended in the exercises, but were not evaluated. Written responses could be compared with the correct answers provided in a column, which had to be covered when answering. Carlsen recommended that students should use the self-analysis chart at the end of his book in order to learn more about the nature of their mistakes. The following example illustrates how he treated the theme of error detection:[381]

Fig. 2.20 Carlsen: Example of error detection



Although CAT has proved to be more flexible in adapting to students' need and difficulty levels than NCAT, new programs utilising taped material are still being published. One of the latest programmed Aural Training courses with

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378 D.L Hattingh, **Programmed Instruction**. Pretoria: Human Sciences Research Council, 1976 p. 85.

379 Ekkehard Arnold, "Gehörbildungsprogramme - Zurück zum Drill, vorwärts zur Vernetzung?" in **Musik und Bildung**, 5 (1990) p. 276.

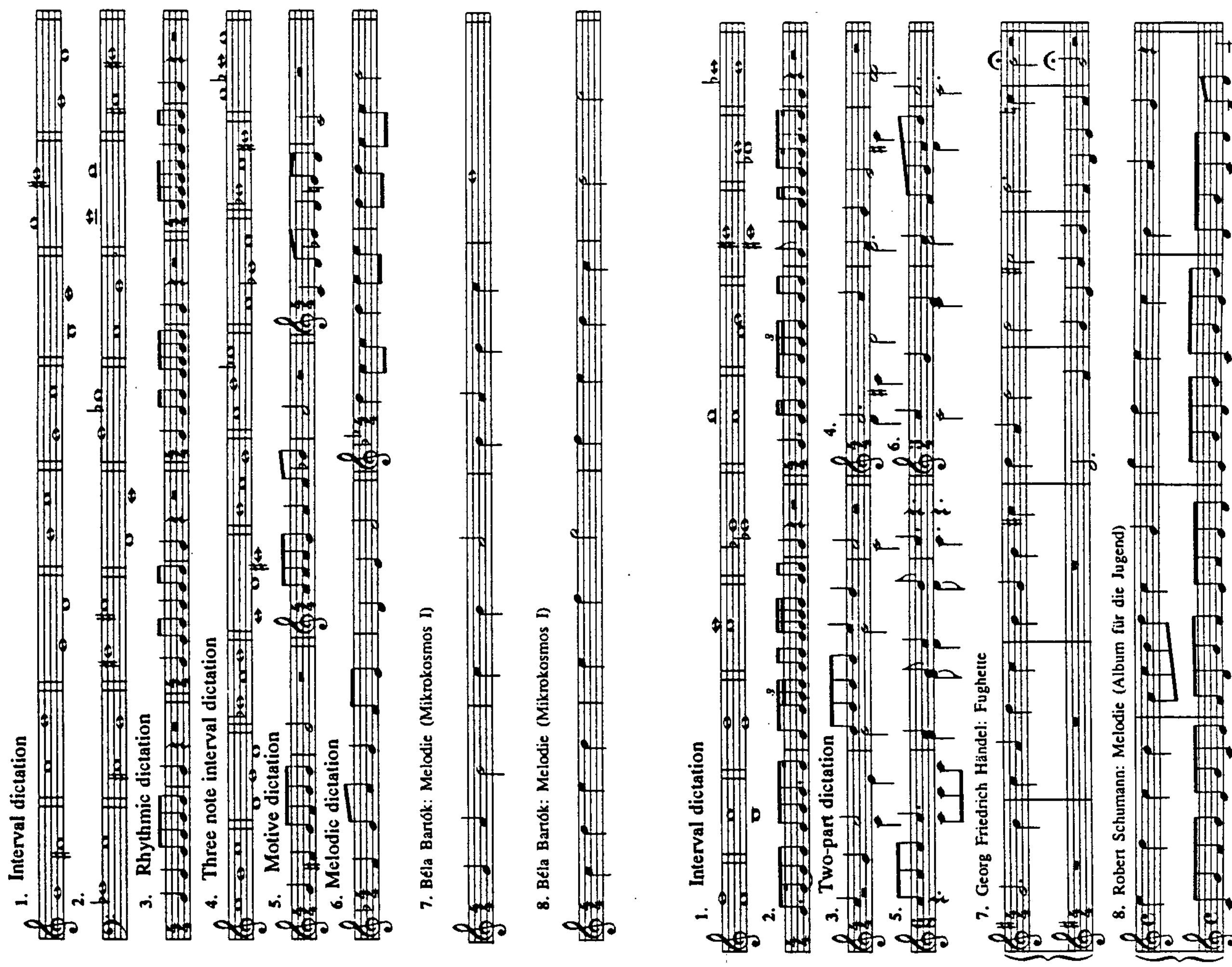
380 Derek Blease, **Evaluating Education Software**. London: Croom Helm, 1986 p. 6.

381 James C. Carlsen, **Melodic Perception: A Program for Self-Instruction.** New York: McGraw-Hill, 1965.

accompanying cassettes was released in 1990 by Wolfram Breuer. His program can be used for High School purposes or as preparation for entrance tests at Conservatories or German *Musikhochschulen*. In a fragmented dictation-orientated approach, starting with melodic second intervals and rhythmic dictation, the course is systematically built up to incorporate ninth intervals, chord identification and eight-bar two-part dictation. Breuer recommended that the dictation solutions given at the end of his book should be used for sight singing purposes. Different instruments were used for the different exercises which were taken from a wide spectrum of excerpts from the music literature.[382] Examples from the first and last lessons have been chosen in order to demonstrate the nature of the contents of the program:

Fig. 2.21 Breuer: Lessons one and twelve

Lesson one **Lesson twelve**



382 Wolfram Breuer, **Gehörbildung - Für Unterricht und Selbststudium.** Stuttgart: J.B. Metzler, 1990.

Between Carlsen's reel-to-reel magnetic tape programmed instruction and Breuer's cassette-based instruction program, several other programs saw the light. The majority of programs were based on the fragmented approach, concentrating merely on written responses to what was heard. The extensive four programmed workbooks and accompanying tape recordings by Horacek and Lefkoff are one of the best examples of this approach. The themes that were treated in the four volumes are: intervals, melody and rhythm, and chords (Parts I and II). By using a tally mark system, students had to reach a pre-determined score in order to continue with the next unit. Apart from singing intervals (the first tone is given by the tape and the student had to sing the second, followed by the two correct answers provided by the tape), interval dictations also formed part of this course. Although the order of the intervals to be learned could be varied by the student, the recommended order was to start with the smallest and to increase the size of the intervals systematically. The second volume started with simple rhythmical dictations and sight singing exercises which basically consisted of second intervals. Major and minor chords were later introduced and combined with second intervals. Melodic dictations were included, starting with four-bar phrases which were later extended to eight-bar phrases. In the other two volumes isolated seventh chords were treated in close and open positions and varied inversions while applying figured bass symbols. Roman chord symbol dictation, figured bass dictation, modulation recognition, non-harmonic tones and chord singing (arpeggio singing) were amongst other things included.[383]

Other examples of fragmented programmed Aural Training were found in, for example, the programs of Robert G. Olson,[384] and Trubitt and Hines.[385] Apart from the training of written responses to aural stimuli, Trubitt and Hines also incorporated "new" methods such as fusing and scanning, which are both described in sections 4.1.4 and 4.1.12.

Influenced by contextual thinking which developed from the cognitive school of thinking, trends of microscopic structural Aural Training can be seen in Leo Kraft's melodic dictation course, in which preparatory dictation assignments consist of recognizing the highest/lowest note(s) of a played phrase.

> "Since the musician's goal is to hear the melody as a whole rather than to hear one or a few notes at a time, the program teaches patterns of melody. The course also stresses melodic shape and contour, teaching the perception of melody in whole phrases."[386]

Sherman and Morris also followed the contextual approach in their program which consisted of a two-volume workbook organised into 57 units of study, a pre-test, exercises, post-test and thirteen stereo LP records, pre- and

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383 Leo Horacek and Gerald Lefkoff, **Programed Ear Training, Vols. I-IV.** New York: Harcourt, Brace and World, 1970.

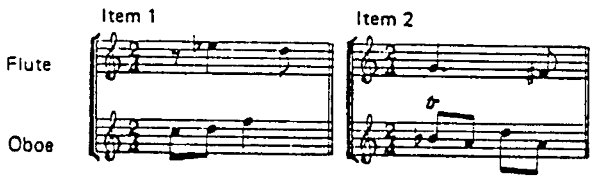
384 Robert G. Olson, **Music Dictation: A Stereo-Taped Series.** Belmont, California: Wadsworth, 1970.

385 Allen R. Trubitt and Robert S. Hines, **Ear Training and Sight-Singing: An Integrated Approach, Books I and II.** New York: Schirmer Books, 1979 (I) and 1980 (II).

386 Leo Kraft, **A New Approach to Ear Training - A Programed Course in Melodic Dictation.** New York: W.W. Norton, 1967 p. 3.

post-test booklets and a teacher's manual. The following is an example of how interval identification could, according to them, be trained within a musical context:[387]

Fig. 2.22 Sherman and Morris: Example of interval identification within a musical context



would be expressed on the answering form as:

1. Flute S ___ D ___ (or S ___ D ___)
A B B A

and appropriately answered S _X_ D ___ to indicate that the second interval heard is the Same as the first.

Another example of the application of microscopic structural learning to Aural Training was found in the program of Kral and Zopf.[388]

One major disadvantage of the majority of NCAT programs is that mostly 'passive' Aural Training is possible, enabling students to give mostly written responses to what was heard. Active responses such as tapping rhythms or singing melodies from sight can only be practised in a form of "self-comparison/evaluation" in which the student compares/evaluates his performance with the tape-played performance. Through the use of certain teaching machines a limited form of active Aural Training is, however, possible.

The use of teaching machines for Aural Training was introduced in the early 1960s by, for example, Harry Hammer. Although not using programmed instruction per se, Hammer utilised a tachistoscope for the teaching of sight singing. The tachistoscope can be described as a "flashmeter used on an overhead projector making it possible to control the illumination and duration of projected images." Thirty-one slides with tonal patterns organised in an easy to difficult setting were prepared. The projected patterns had to be sung with letters or syllables. In his experiment, tachistoscopic training proved to be more effective than conventional blackboard and music staff paper training.[389]

Programmed instruction, utilising teaching machines for enable 'active' Aural Training, was made possible by the *TAP Master* and the *Pitch Master Systems* developed by David L. Schrader in 1974 and 1983. The first program aims to develop rhythm reading skills and performance abilities and consists of the TAP MASTER II Unit, cassette tapes and accompanying books, stereo headphones, cassette tape deck (provided by user), and optional acrylic stand.

While listening to a cassette tape from one of the *Tape Series* through headphones, the narrator guides the student through the rhythmic exercises in the accompanying book. Each exercise has to be performed by tapping on the *TAP*

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387 Robert W. Sherman and Morris H. Knight, **Student Workbook for Aural Comprehension in Music Vol. 1.** New York: McGraw-Hill, 1972 p. iv.

388 Walter Kral and Ivo Zopf, **Gehörbildung - Lehrgang für individuelles Selbststudium Band 1.** Vienna: Österreichischer Bundesverlag, 1989.

389 Harry Hammer, "An Experimental Study of the Use of the Tachistoscope in the Teaching of Melodic Sight Singing" in **Journal of Research in Music Education**, (1963) pp. 44-45, 52.

Master Unit's "TAP Button". A correct response is accompanied by a percussive sound that overlays the music of the exercise. If the tap is early or late by more than a few thousandths of a second, the percussive sound is not heard. Each correct tap is also counted by a LED counter, thus reinforcing accurate performance through the percussive *sound* and by the numerical *score* displayed on the counter. Three phases of the development of rhythmic ability while using *TAP Master* can be determined: (a) students learn to listen to music and to discern its pulse; (b) rhythms which relate specific patterns to the internalised pulse are to be read; (c) visual patterns are absorbed kinesthetically. The student is conditioned to "feel" rhythms at sight through direct muscular responses. The rhythmic exercises are set against a background of music from "Bach to Bacharach, orchestral to synthesizer", enabling the studying of rhythms within a musical context. In three series (110 cassette tapes) the rhythmic ability of a beginner can be developed to reach a professional level. Two TAP Master units can be connected with each other, enabling more than one student at a time to respond to the same tape and tape player. Responses and scoring remain independent as the students participate in a degree of competition.

Basically the same principles are followed in the *Pitch Master System* which aims to develop basic pitch concepts and sight-reading skills in a context. Through an added microphone students have to sight sing exercises along with an accompaniment. While a student is singing a pitch sequence, he can hear his own voice on one side of the headphone. If he is 'on tonal target', a reference tone of the correct pitch sounds on the other side of the headphone. This reference tone immediately disappears if the student makes a mistake or when he sings out of tune. Students' responses are reinforced by a meter which indicates if the student's tone is on pitch or whether it's sharp or flat, as well as the degree of deviation. A numerical score is also given for each exercise which can be compared with the score printed at the end of each exercise in the book. Three difficulty levels (45 tapes) are available, and the teacher can also create his own tapes.[390]

4.2.2 Computer-assisted Aural Training

The history of the use of computers in the field of music started in 1957 with Max Mathews who developed direct computer synthesis at the Bell Laboratories. A chronological description of the history of system developments and hardware breakthroughs is beyond the scope of this study. There is nevertheless a strong correlation between the developmental level of computers and other electronic music instruments (hardware) and the programs (software) used.[391] The electronic equipment with its programmable potential used in CAT has a stronger influence on the programs developed than is the case in NCAT. Therefore a part of this section on CAT will be devoted to a short description of computer hardware.

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390 Temporal Acuity Products (TAP), **Temporal Acuity Products - Music Education Solutions** (Catalogue). Bellevue, WA: TAP, [n.d.] pp. 4-10. (Accompanying letter dated October 1991.)

391 A computer system consists of hardware and software. The term *hardware* refers to the physical parts which can be touched as material objects. *Software* is the intellectual part in which the information or data that is fed into the computer. These lists of instructions, called programs, tell the computer what to do.
Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 p. 1.

The two types of computer music systems that can be distinguished are the **dedicated** and **generic** systems. **Dedicated systems** are specially designed to accomplish a specific task or set of tasks, and are sold by a single representative. Examples of dedicated computer music systems are the *Fairlight, Synclavier, Yamaha CX5M* and *Exercetta*.[392]

[392] The *Exercetta* is an innovative drill-and-practice computer designed by Martin Prevél in 1984 in Canada. A flat, touch-sensitive command panel on which overlays are placed, is used as input device. On the top section twelve function keys and a 39-key piano keyboard are placed, and the lower section has 102 touch locations for music education course overlaps. An internal synthesizer which produces the timbre of an electronic piano is used and programs are on memory chips. In both *Exercetta* Aural Training programs [Ear Training 1: Chord Quality #1, Harmonic Dictation #1 (Major), Harmonic Dictation #1 (Minor), Intervals, Rhythmic and Melodic Dictation #1, Scale Degrees, Ear Training 2: Chord Quality #2, Diatonic Tonal Functions, Harmonic Dictation #2 (Major), Harmonic Dictation #2 (Minor), Pitch Accuracy, Vertical structures] students have the choice of (a) the exploring mode in which they can hear and compare sounds by touching symbols on the overlay; (b) initial training mode, in which the computer asks randomly generated questions and lets the students compare possible answers; (c) intensive training, in which a question is repeated if the students get it wrong; and (d) the test mode, in which students must answer a certain pre-determined number of questions for which the computer keeps score. The user has control over several aspects, such as the number of questions which is initially set to them and they can also choose the material (e.g. harmonies) to be included and change the key of the exercise.
A *Melocaptor* option makes possible the teaching of sight singing by connecting the *Exercetta* to a microphone. Through the use of the software *Basic Vocal Intonation*, the Melocaptor can tell what basic pitch the student has sung and how close it is to true concert pitch within one sixteenth of a tone. The student can either choose (a) the repetition mode in which single notes, intervals, tetrachords and arpeggios should be repeated, and (b) the sight singing option requiring the student to sing a notated stimulus without hearing it. A generic Apple version of the *Melocaptor* is also available.
Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 pp. 47-48.

Because the number of programs for dedicated computers is limited and because prices are beyond the financial scope of the average musician, **generic systems** which are based on brand-name microcomputers and are configured by mixing and matching components as the user can afford them became more popular.[393] Thomas E. Rudolph listed the following computer manufacturers and generic computer models that are used in Computer-assisted Music Education:

Apple II (IIe, IIc, IIgs)
Apple Macintosh
Atari ST
Commodore-64/128
Commodore-Amiga
IBM XT, AT, PS/2[394]

As the aspect of sound generation is important for the Aural Training teacher, it is necessary to look briefly at the four ways to generate sound in a microcomputer. The first is called *speaker tweaking* in which electrical pulses are sent to the speaker mounted inside the computer. Volume cannot be controlled and the timbre is limited to square and pulse wave-shapes. In the second instance, *internal sound chips* (microprocessors specially designed to generate sound), which are limited to three and four voices, are used. In the *direct synthesis* approach the microcomputer's central processor is used to compute sound waves and then send them directly to a speaker without the aid of a sound chip. Finally, *external sound generators* such as keyboards, synthesizers, samplers, videodiscs and compact discs can be used.[395] The development of MIDI opened new doors for sound generation and communication between electronic

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393 Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 pp. 22-23.

394 Thomas E. Rudolph, "Technology for Teaching: Selecting a Personal Computer - Manufacturers and Models" in **Music Educators Journal**, 76 (October 1989) pp. 69-70.

395 Since the first instrument to generate electronic sounds, the Telharmonium, was developed in 1897 by Amadeus Cahill, the development of electrophones, a term used by Curt Sachs and E. von Hornbostel in 1914, (synthesizers/keyboards/samplers, etc.) underwent tremendous development.
Michael Harenberg, **Neue Musik durch neue Technik? Musikcomputer als qualitative Herausforderung für ein neues Denken in der Musik.** Kassel: Bärenreiter, 1989 pp. 20 and 29.
The term *keyboard* is often used for a variety of electronic instruments which have a piano-like keyboard.
Synthesizer is a term used for an instrument in which tones, sounds and noise structures are merely produced by electronic means such as oscillators. It also has the ability to process sounds stemming from other instruments. Bernd Enders, **Lexikon Musikelektronik**. Mainz: Schott, 1985 p. 235.
The term *sampler* and the technique of *sampling* can be defined with the following quotation: "The most revolutionary aspect of modern music is sampling. Nothing allows a composer or recording musician to sound more like something else - anything else - than a sampling device, or what we commonly refer to as a sampler. This is quite amazing when you realize that sampling is based on one of the oldest of music technologies: recording. A sample is a recorded sound that is then used like a patch on a synthesizer, except that now it can be a true recreation of a speaking voice, a car crash, or a trumpet - not a computer-generated simulation or emulation. This is oversimplifying it a bit, but not much. Sampling is a term for a specific kind of recording - recording other sounds into a form that can be used by keyboards, drum machines, guitar synths, computers, and so on." Harvey P. Newquist, **Music & Technology**. New York: Bilboard Books, 1989 p. 111.
Videodisc: "Videodiscs contain digitally encoded sounds and graphics that can be shown as still slides or moving pictures. Within a few seconds, any one of 54,000 images can be located and displayed. Real music notation can be scrolled across the screen as the music plays in stereo." Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 p. 16.

equipment enriching programmed music instruction.[396] The use of plug-in synthesizer cards such as the *Mountain Music System, MMI DAC Board*, the *ALF card, Mockingboard* and the *IBM Music Feature Card* can also be included here, as these cards can be plugged into the Apple's and IBM's expansion slots.[397]

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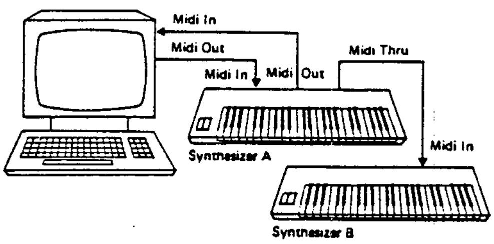
[396] During the early 1980s, *Musical Instrument Digital Interface* (MIDI) was developed in order to allow the sending and receiving of information, but also for distributing that information between electronic equipment (e.g. different synthesizers, synthesizers and computers). MIDI's primary function is to enable communication or networking between two or more electronic instruments such as keyboards, drum machines, samplers, guitar synthesizers, microcomputers fitted with a MIDI connection, software for recording, composing and writing music, as well as peripheral effects such as sound enhancers (reverb, chorus, distortion, etc.). The connection of two or more electronic instruments by means of a MIDI link theoretically creates endless control possibilities. Individual synthesizers, for example, can be singled out in a network and can be told when to sound. Hofstetter addressed some of the advantages of MIDI for CAT: "As the cost of MIDI keyboards continues to decline, and as MIDI interfaces become standard equipment on brand-name microcomputers, music courseware will be able to take advantage of keyboards and synthesizers that have heretofore been too expensive for widespread use. By using samplers to play music in CAI programs, students will be able to listen to the actual sounds of acoustic instruments instead of the boring square-waves most programs use today. MIDI microphones, such as the Pitchrider produced by IVL Technologies Ltd., will allow the computer to listen to students perform. Music-minus-one applications will teach students how to play in tune and in time with an ensemble. The biggest problem in sight-reading pedagogy is that when students practice by themselves, they cannot tell whether they are singing the correct pitches. With MIDI, they will learn how to read music by singing into a microphone and watching the computer indicate how close they are to the notated pitch." A typical MIDI configuration looks as follows:

Fig. 2.23 A typical MIDI configuration

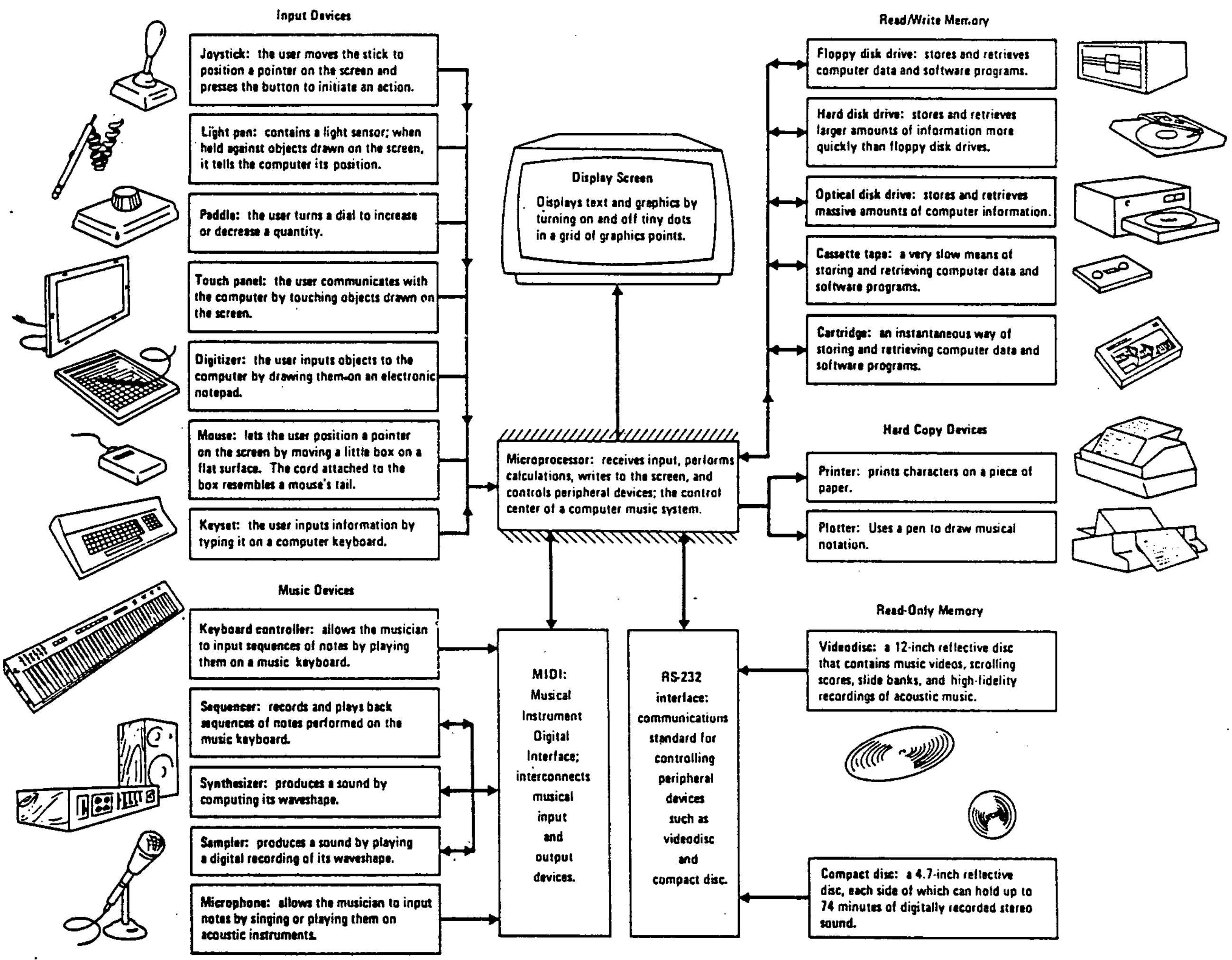


Harvey P. Newquist, **Music & Technology**. New York: Bilboard Books, 1989 pp. 37-41.
Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 pp. 79 and 81.

[397] Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 pp. 4-5, 68-73.

The following block diagram is an example of a fully configured computer music system in which the four basic types of computer hardware (input, central processing unit, memory unit and output) are portrayed:[398]

Fig. 2.24 Hofstetter: Block diagram of a fully configured computer music system



In the field of computer applications to Aural Training the University of Delaware's GUIDO Ear-Training System (first developed on a Burrough mainframe computer in 1973, then adapted to the PLATO system in 1975, micro PLATO in 1980 and IBM PC in 1985), is one of the milestones in CAT.[399] In 1978, *Micro Music Inc.* (MMI) began to publish a set of Aural Training programs available for the Apple II computers under the guidance of David Williams. During the 1980s several companies and individuals such as the *Minnesota Educational Computing Consortium*, *Electronic Courseware Systems*, *Silver Burdett*, *Will Harvey*, *Xanadu*, etc. developed Aural Training software. Although the Apple II family has the worst built-in sound capability of any microcomputer, most software was

398 Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 p. 3.

399 The PLATO system is the largest *mainframe* computer in the education field. It is a large-scale computer which can be used simultaneously by many people. The opposite of a mainframe computer is the microcomputer.

developed for it merely because of market-orientated reasons.[400] Trends at the end of the 1980s indicated that software for the Macintosh and IBM computers became more important.

> "Of the music software presently available, less than half is for computers other than the Apple II series. However, most of the software being written today is for the MS-DOS (IBM compatible) and Apple Macintosh computers. In the next five years, we will see a strong shift of software to the MS-DOS and Macintosh environments. The Apple II will continue to be the choice for music education for at least four years, but it will lose its place to more powerful machines after that time."[401]

The discussion up until now has mainly concentrated on the hardware equipment used in CAT. The software is actually more relevant because it forms the heart of programmed instruction in that it contains the teaching philosophy, goals and contents of instruction. Wittlich et al. discussed four typical CAI "delivery modes" (program forms) which increase in complexity of design and implementation from the top to the bottom:

(a) *Drill and practice*: exercises appropriate to basic musical learning tasks, such as musical rudiments are constantly repeated in a form of presentations - response - feedback.

(b) *Games*: activities involving individual decision and a competition element, e.g. identifying intervals within a time limit.

(c) *Simulation*: "a replication of the behavior of a phenomenon of one's universe designed to substitute for the phenomenon" - composition exercises can be a form of simulation lesson in music, but automated evaluation in terms of correctness is still problematic.

(d) *Tutorial*: Wittlich quoted J. Richard Dennis on this mode of delivery, which is "'...a simulation of the interaction between the 'ultimate' instance of an expert teacher and an arbitrary learner. In this sense, a tutorial lesson may be viewed as a concept from the field of artificial intelligence - an attempt to create, in machines, a type of exemplary human behavior. The basic elements of a tutorial lesson consist of an array of questions together with an intricate network of decisions connecting these episodes. The attempt is to simulate a very personal, and individually tailored, conversation between the 'expert' teacher and the widely varying student.'"[402]

From the list of commercially available CAT software that is presented in Appendix E, it is clear that the contents of the majority of programs include drill and practice in intervals, chords, dictation and tuning. The most frequently used modes of delivery are games and drill and practice. The *Interval Mania* and *Chord Mania* programs which are distributed by Temporal Acuity Products are examples of games in the "beat-the-clock" format. Also distributed by the same dealer is the *Magic Musical Balloon Game*, where aural recognition of up, down or the same are taught with the visual help of a balloon moving over mountains, down from trees, or straight along a fence. The students also have control over the movement of a balloon which enables them to create their own melodies.

All programs with a fragmentary approach make use of these two modes and usually represent 'passive' Aural Training, demanding written responses either in the form of text, notation or answers clicked on on-screen keyboards/guitar frets. The GUIDO Music Learning System is one example of many programs in which the fragmented approach is used. In this program isolated intervals and chord qualities are drilled, and harmonic, rhythmic, pitch and melodic dictation presented. The student has control over the tempo, answering mode (pitch

400 Fred T. Hofstetter, **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988 pp. 67, 123-126.

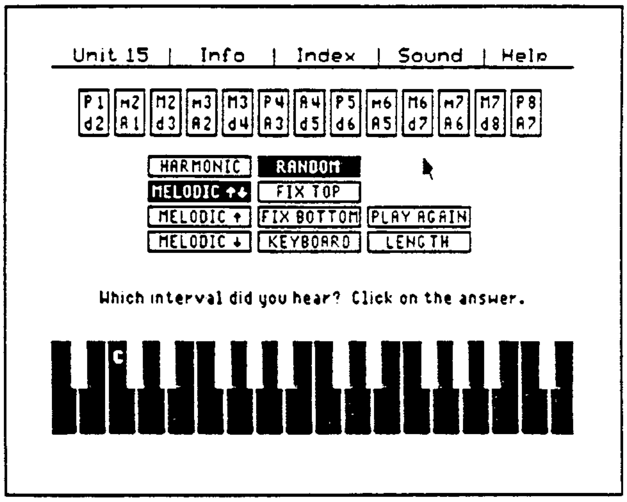
401 William R. Higgins, **Computer applications in Music Education for the Apple II Series, Macintosh, & IBM Microcomputers.** Grantham, Pennsylvania 1990 p. 86.

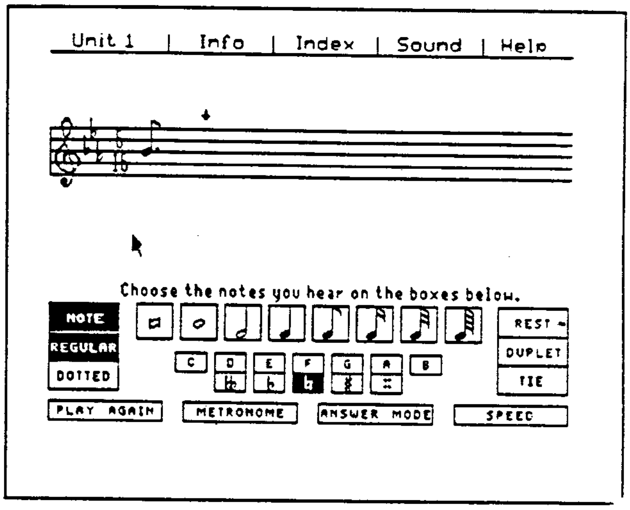
402 Gary E. Wittlich, John W. Schaffer and Larry R. Babb, **Microcomputers and Music.** Englewood Cliffs, New Jersey: Prentice-Hall, 1986 pp. 75-76.

names or solfeggio syllables), timbre and style of harmonic dictations (played in block chords, arpeggiated down... a choice between nine different possibilities).

The following two diagrams are examples of the drill and practice on intervals and the dictation of melodies as they appear in the program GUIDO:[403]

Fig. 2.25 Practice Unit 15 *(Intervals* lesson) and Unit 1 *(Rhythmic Melodies* Lesson) from the GUIDO computer program





A few programs address contextual Aural Training of which *Hear Today...Play Tomorrow* is one example. In this program, a melody is heard and the missing notes should be added in the score (completion tasks). Programs demanding active response from the students in the form of the contextual sight reading of rhythms, the sight singing of complete melodies and/or repetition of short melodies on MIDI-instruments simulate to a certain extent skills that are applied in everyday musical life.

The sight singing program developed by Mary Jo Lorek and Randall G. Pembrook for the Atari 1040ST micro-computer in conjunction with the Roland V-70 Voice Processor is one of the newest in the field of assessing sight-singing efforts and simulating human evaluation. The authors briefly reviewed the history of what is commonly

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403 Fred T. Hofstetter, **The GUIDO Music Learning System: Ear-Training Lessons IBM PC Version 2.1 - Student Guide.** Delaware: University of Delaware, 1989 pp. 17 and 47.

known as 'pitch extraction',[404] by referring to the research of, for example, Wolfgang E. Kuhn and Raynold L. Allvin (1967), Warren C. Campbell (1970), David G. Peters (1876), David L. Graves and John Lundin (1980), Randall M. Kolb (1983), Paul E. Dworak and Jane Cledinning (1986), Warren Joseph, Xanadu's *Ear Training and Sight Singing*.

Lorek and Pembrook stated that their program is unique since both frequency and rhythm errors could be evaluated taking into account slight alterations in tempo and tonal center. The program has two modes: (a) a student interface with melodies and performance options, and (b) an evaluation mode. The student first has to select a melody to sing and has the options of transposing it if necessary, choosing a tempo between MM = 30 and 144, hear a I IV V7 I progression one or more times, and to hear the opening pitch as many times as necessary. A two-measure-long introduction, in which visual and aural cues (numbers flash on the screen and a metronome ticks on the frequency of the initial pitch) appear, is provided in order to indicate the tempo. After these two introductory measures the rhythmic click track ceases, and the student has to sing into the microphone while his responses are recorded on a special developed MIDI recorder for evaluation purposes. Evaluation information covers pitch errors, rhythm errors, starting pitch, ending pitch, starting tempo, ending tempo, and 'debug data' (detailed frequency and rhythm information about each performance).

The evaluation criteria were derived from a pilot study in which an experienced sight singing teacher consistently rated pitches performed within 50 cents of the model pitch as correct. A frequency response was thus considered correct if it was within approx. 50 cents (a quarter tone) of the absolute frequency for a note in the given melody (equal-tempered scale with A4 = 440Hz), or if it was within approx. 50 cents of the correct interval created with the previous note. Mistakes were evaluated in the context according to interval size, considering all tones except the initial mistake as correct. The syllable *tah* was chosen to sing on because it provides discrete boundaries. Also based on pilot testing information, a limit of approx. 15% of the 128 times per second that the internal Atari clock ticks was determined. Proportionally correct durations were accepted as correct.

The effectiveness of the program was tested at the Conservatory of Music at the University of Missouri-Kansas City by comparing computer evaluations with the human evaluation of three sight singing instructors. The proportionally contextual evaluation approach to rhythm and pitch were agreed on in order to use the same evaluation criteria as the computer. Interjudge reliability coefficients between all instructors, and for each instructor with the computer program, indicated that the computer evaluation was an accurate simulation of the teachers' judgments. Teachers

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404 Although this term describes the function of human pitch extractors - the ears and brain - Jo Lorek and Randall Pembrook did not consider this term to be accurate in describing the computer process. When the human ear is presented with a periodic waveform, it attempts to draw forth (extract) a name (E, B-flat, etc.) for the place this sound represents on a high-low spectrum (pitch). This ability of pitch extraction is well developed among most experienced sight-reading/singing teachers, but it can be reduced when a complex rhythmic and tonal syntax is heard only once, or if a melody is performed out of tune by the student. Many teachers view pitch extraction as a tiresome task which may also be subjective. All the different experiments with computer pitch extraction reflects the desire to assign this task to a more objective, tireless, and thorough evaluator. The authors, however, felt that the term pitch extraction does not accurately describe what occurs during that process with machines, and re-labelled pitch extraction as fundamental frequency transforming.
Mary Jo Lorek and Randall G. Pembrook, "Present and Future Applications of a Microcomputer-based Frequency Analysis System" in **Psychomusicology**, 8/2 (1989) pp. 97-98.

appeared to be less strict than the computer, accepting an answer as correct unless the pitch was performed more than 60 cents sharp or flat. The value of the the last note was never judged as incorrect even if a half note was sung as a staccato eighth. The problem that arose is whether the computer program should be revised to match the human perception represented by "expert" teachers, or whether the program should be slightly "stricter" in order to intensify the listening skills of both students and instructors.[405] [406]

The field of computer-assisted instruction has by no means developed to its full potential, a fact that is emphasised by articles such as "*Moet de musicus worden omgeschoold tot informaticus? Technologie: diabolus in musica of gradus ad parnassum?*[407] For Peter Weiss the use of computers leads to "robot thinking" in which computer capabilities, such as the saving, recalling and combining of information, are confused with human learning, memory and thinking. The result of having the computer as teacher also leads to a student falsely believing that he knows and is able to manipulate the material.[408] Although referring to the application of computer-assisted instruction to general school music education, the problems that were addressed by Ekkehard Arnold can also be applied to CAT. He pointed out that the aural identification of a blues scheme is more relevant than the fragmented approach seen in the aural recognition of an inversion of a single triad. Regarding the sound generation of computer-driven sound modules and samplers, Arnold also emphasised the fact that these electronic instruments only partially represent reality. He furthermore observed that programs are adapted to the technical level of the computers.[409] It is also questionable whether the often random computer-generated music examples meet the musical requirements set by the music literature. As an answer to this problem some programs allow the student to choose from a music library, which is made up of excerpts from examples from the music literature, or allow them to "customize" their own melodies. Ansgar Jerrentrup addressed other frustrations such as imprecise instruction manuals and the use of unknown terminology often faced by teachers who are trying to inform themselves about CAT, or are attempting to learn a computer program.[410]

There is furthermore a tendency to concentrate on a limited number of Aural Training methods that are easily graded in terms of right and wrong. Programs based on holistic approaches to Aural Training are scarce. During 1982

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405 Mary Jo Lorek, "Computer Analysis of Vocal Input: A Program that Simulates College Faculty Sight Singing Evaluation" in **Computers in Music Research**, 3 (Fall 1991) pp. 122-138.

406 Mary Jo Lorek and Randall G. Pembrook, "Present and Future Applications of a Microcomputer-based Frequency Analysis System" in **Psychomusicology**, 8/2 (1989) pp. 97-109.

407 Henk Smeijsters, "Moet de musicus worden omgeschoold tot informaticus? Technologie: diabolus in musica of gradus ad parnassum?" in **Mens en Melodie**, 42 (February 1987) pp. 52-59.
("Must musicians be retrained as computer programmers? Tegnology: *diabolus in musica* or *gradus ad parnassum*?" Researcher's own translation.)

408 Peter Weiss, "Computer können nun einmal nicht singen - Vortrag bei der D-A-CH - Tagung Ende April in Österreich - Teil 2" in **Neue Musikzeitung**, 37/4 (August/September 1988) p. 25.

409 Ekkehard Arnold, "Gehörbildungsprogramme - Zurück zum Drill, vorwärts zur Vernetzung?" in **Musik und Bildung**, 5 (1990) pp. 275-277.

410 Ansgar Jerrentrup, "Die Angst des Musiklehrers vor Bomben und anderen Überraschungen beim Einsatz des Computers im Unterricht" in **Musik und Bildung**, 6 (1989) p. 331.

Richard Douglas Ashley developed a program called LISTENER which was based on a theory of musical cognition, portraying the cognitive qualities of a listener. This program 'listens' to a computer-composed piece of music, and provides a memory record of some of the events of the music. His preliminary goal was to write a program which would be able to give descriptions of the music equivalent to those which are obtained by answering the preliminary questions in a section of the Wittlich and Humphries Aural Training text mentioned in section 4.1.11. The foundation of the Wittlich-Humphries method is that musical skills should be developed in the context of dealing with real music and that analysis is a relevant and legitimate model for the understanding of skilled listening. After first listening to a piece of music the student has to answer general questions. During the next steps the questions become more specific, followed by drills on certain rhythmic patterns and melodic or harmonic figures taken from the piece, and dictation.

In his program Ashley attempted to represent this listening process. A compositional program called MORTYFRA was used to compose a piece upon which LISTENER could work.

> "The scenario is as follows: the listener hears the first few notes of the MORTYFRA piece. Given a certain kind of musical know-how equivalent to that which most undergraduate music majors would have, he would be able to place the piece as being 'modern' music (through the lack of obvious tonality, the sparse texture, and the electronic sounds of the oscillators). At this point a few of his procedure packages for dealing with music drop away -- those which would let him deal with Mozart, for example. He is left with a few more things that he can look for. One is the beat; the sparseness of the piece's beginning makes the appearance of what might be considered a beat in the more active sections all the more striking. Thus, the 'beat' procedure is called upon to help make sense of the music. The student also recognizes the main parametric setup of the piece; this becomes more clear as the sections advance, showing him that the music is in fact largely molded by the changes to be found in the values of the three main parameters. His goal in listening is to be able to describe the music in some general way ... At the end of his listening he can talk about the overall sectional construction of the music, as well as the relative importance of the different attack densities and the way in which the piece goes in and out of having a beat."

This last task of generally describing the music was not undertaken in the LISTENER program. Further learning and more detailed relationships as presented in the Wittlich-Humphries method are not addressed in this program.[411]

Unfortunately no commercially available program was developed based on Ashley's approach to aural analysis, because of practical programming problems attached to it. Computer-based programmed Aural Training suffers from a general tendency to adapt software to the capability of the hardware instead of, as Johannes Goebels recommended, defining software first and then the hardware.[412]

Ekkehard Arnold penned some of his software dreams, which are as follows: a MIDI-version of a polyphonic music piece written for a melody instrument, bass, guitar and percussion is played by the computer with graphical notation or traditional notation appearing on the monitor parallel to the played music. The user has the possibility of changing the tempo of the piece without influencing pitch, and one or more than one voice can be amplified dynamically speaking or totally omitted. The student should, for example, listen to the rhythmical pattern and clap it, as well as identifying the places where the pattern changes. This should be followed by identifying harmony changes and

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411 Richard Douglas Ashley, **Toward a Theory of Instruction in Aural Skills**. Doctoral Dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982 pp. 102-103, 121-138.

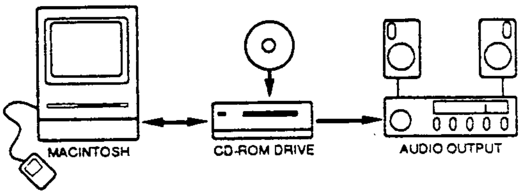
412 Johannes Goebel, "My Dream (Machine?)" in **Computer Music Journal**, 15/4 (Winter 1991) p. 49.

cadence functions. In the melody part a frequently returning motive should be identified and be repeated vocally. The bass part should be played on the MIDI keyboard and then be notated. Changes by the user in the on-screen notation should be possible. Another dream of Arnold is the computer simulation of musical situations such as a school choir rehearsal. The student has to identify for example intonation mistakes and correct them.[413]

Arnold's hopes are not impossible to fulfil. A new form of computer technology, called computer-controlled multi-media, integrates text, audio and video with computer. Referring to the "intelligences" defined by Gardner (logical-mathematical, linguistic, bodily-kinesthetic, musical, spatial and interpersonal) in 1983, Yolanda Jenkins pointed out that multi-media technology has the potential of tapping and stimulating each of these "intelligences".[414]

Warner New Media gave a step in the direction of incorporating multi-media into Music Education with their development of CD+G (Compact disc plus Graphics). Through this technology it is possible to view lyrics, pictures and other visual accompaniment on a television screen while listening to a Compact Disc. This development was followed by Audio Notes' CD-Rom, in which a CD-Rom drive can be attached to a Macintosh computer and audio playback equipment such as headphones, desktop speakers or the most sophisticated stereo system:

Fig. 2.26 A typical CD + G configuration



In the *Portable Symphony* series, a moment-by-moment descriptive analysis of, for example, Anton Bruckner's Ninth Symphony is displayed on the computer screen while the music sounds. With the aid of a *selections card*, the user can choose exactly where he would like to skip to, and the *CD Control Panel* enables rewind, fast forward scan, skip, pause and play functions. The CD-Rom program *The Orchestra* has the following features: details of nearly fifty different instruments of the orchestra are presented with photos of how they are played, diagrams, and more than five hundred audio examples which range from seagulls to Stravinsky. In a conducting lesson students are able to 'pick up the baton' and follow the diagrams and musical examples. The *Orchestration Lab* function enables the student to select the instruments that should play.[415]

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413 Ekkehard Arnold, "Gehörbildungsprogramme - Zurück zum Drill, vorwärts zur Vernetzung?" in **Musik und Bildung**, 5 (1990) p. 277.

414 Yolanda Jenkins, "Multimedia Technology: Tools for Early Learning" in Sueann Ambron and Kristina Hooper (Eds), **Learning with Interactive Multimedia - Developing and Using Multimedia Tools in Education.** Redmond, Washington: Microsoft Press, 1990 pp. 116-117.

415 Warner New Media, **Newness**, 1/3 (July 1991) pp. 1-3.
Warner New Media, **Audio Notes** - specification sheet on *The Orchestra*, [n.d.].

Multi-media has not yet been incorporated into the field of CAT, but it is hoped that programmers will start to dream the 'impossible' dream! They should move away from developing drill-and-practice programs, and start to develop Aural Training software from a comprehensive and holistic viewpoint, taking into account music psychological cognitive learning theories. The possibilities of CD-ROM should be explored in order to enable the inclusion of "real" music (e.g. as on Compact Discs) into programs. Until this happens, it is doubtful whether the use of the computer will lead students to understand more than isolated intervals and chords.

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CHAPTER THREE

A questionnaire-based survey

As stated in Chapter One, the purpose of this research endeavour is primarily to develop an understanding of the state of Aural Training as presented at a tertiary level. A broad spectrum of Aural Training aspects that could be found in subject-related literature and other sources were described in Chapter Two, which forms the *theoretical* part of this study. In order to complete the picture of Aural Training, the second *practical* part (Chapter Three) aims, by means of a questionnaire, to present a view of certain aspects of Aural Training as they appeared in teaching practice in 1991 at selected tertiary music institutions.

The survey was limited to music education on a tertiary level, because of its direct influence on primary and secondary music teaching. Trends manifested in the curricula and didactics will inevitably be reflected in primary and secondary music education. The extent to which primary and secondary curriculum planning enables the incorporation of Aural Training remains an open question which this survey does not attempt to answer.

The information contained in Chapter Three is categorised under the following headings:

1. Objectives of the research project 1991
2. Design
3. Results, discussions and conclusions
4. Summary and recommendations

1. OBJECTIVES OF THE RESEARCH PROJECT 1991

The **primary goal** of this investigation was to describe the general state of Aural Training in three countries. The **secondary goals** were (1) to compare aspects of Aural Training in the three countries; and (2) to examine the validity of the following practical hypotheses:[1]

(a) Aural Training is looked upon as a subject that merely supports other subjects.
(b) Aural Training is treated as a separate subject in the curricula of tertiary institutions.
(c) The teaching time available for Aural Training is not sufficient.
(d) More emphasis is placed on Sight Singing and Dictation than on other teaching methods.
(e) Aural Training is taught only in the smaller contexts of musical phrases and little attention is given to an overall structural approach.
(f) Computer-assisted instruction is not included in the majority of Aural Training curricula.
(g) In cases where Computer-assisted Aural Training has been applied, the achievements of students have improved noticeably.

Against this background of primary and secondary goals, the investigation more specifically concentrated on collecting information concerning:

(a) curriculum planning (status of subject; time available for teaching; teaching settings);
(b) the goals of Aural Training;
(c) "ideal" teaching circumstances;
(d) teaching methods;
(e) handbooks and/or workbooks that are used;

1 Edwin E. Gordon distinguished between a statistical and a practical hypothesis in his book **Designing Objective Research in Music Education: Fundamental Considerations**. Chicago, Illinois: G.I.A. Publications, 1986, pp. 10-11.

(f) the substance of teaching materials: literature and/or "self-composed";
(g) holistic approaches to Aural Training such as analysis of forms based only on what is heard (*Aural Analysis*);
(h) attitudes towards research in Aural Training;
(i) computer-assisted Aural Training (CAT);
(j) attitudes towards CAT;
(k) reasons for neglecting CAT;
(l) the effect of CAT on achievement;
(m) the role of the computer: as part of teaching and/or homework;
(n) computer users: weak/good/all students;
(o) hardware, software and MIDI implementations;
(p) recommendations for improved software;
(q) non-computer-based Aural Training "programmes" e.g. handbooks with exercises included on audio cassette(s) or reel to reel tape(s).

The nature of this study is thus descriptive, exploratory and explanatory:[2] **descriptive** in the sense that it attempts to sketch the state of Aural Training in 1991; **exploratory**, because relatively unexplored areas such as Aural Analysis and CAT are examined; **explanatory**, in the sense that reasons for the omission of CAT are sought, and that possible relationships between isolated aspects of Aural Training are identified in cross-tabulation calculations.

2. DESIGN

2.1 Measuring instrument and target group

Information on Aural Training was collected by means of a structured **mailed questionnaire** consisting of multiple choice answers and open questions. The advice of three authorities in the field of Aural Training was sought in compiling the contents of the questionnaire.[3]

The **target group** to which questionnaires were mailed was restricted to lecturers of Aural Training at tertiary institutions located in:

- the Republic of South Africa (RSA)
- the Federal Republic of Germany "East and West" (FRG)
- the United States of America (USA)[4]

Lecturers from these three countries were included for the following reasons: firstly, the Western Classical music tradition is followed at tertiary institutions in all three countries.[5] Secondly, undergraduate music courses offered at German *Musikhochschulen* more or less have the same contents as undergraduate music courses offered at universities in the RSA and the USA. Thirdly, Aural Training literature from both Germany and the United States is used at

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2 B.J. Dixon, "Opnamemetodes" in J. Schnetler (Ed.), **Opnamemetodes- en praktyk**. Pretoria: Human Sciences Research Council, 1989, pp. 12-13.

3 Dr. Paul Loeb van Zuilenburg, Prof. Irene Matz, and Prof. Rainer Wehinger. Dr. Marianne Hassler and Mr. Karl Kirschmann assisted the researcher in statistical issues.

4 The abbreviations will be used throughout the rest of this chapter. The abbreviation *ALL* refers to all the Aural Training lecturers from the three countries calculated as a whole.

5 Along with the political changes in South Africa there is a growing tendency towards the incorporation of Ethnic Music in music departments. Yet, the core of serious music studies remains Western.

South African university music departments, and it therefore indirectly influences teaching methods in the RSA. Fourthly, certain aspects of Aural Training are typical to both the FRG and the USA. One aspect is the well-known fact that the USA is a leader in the field of CAT, and that American music computer software influences teaching in the RSA and the FRG directly or indirectly. A second aspect is the use of Aural Analysis that has become more popular and important in the FRG. The subject in general, as well as Aural Training in the RSA, can benefit from a closer look at these aspects.

The homogeneity as well as the diversity of the three countries was the reason for selecting them.

2.2 Sampling procedures

For the RSA and the FRG the whole population of Aural Training lecturers teaching at universities with music departments and state-acknowledged *Musikhochschulen* was taken into account. Thirteen lecturers teaching at 13 South African universities received questionnaires,[6] and 153 questionnaires were mailed to lecturers teaching at 25 German *Musikhochschulen*.[7]

It was necessary to draw a sample of Aural Training lecturers in the USA for various reasons. Not only does the whole population consist of possibly more than 1500 people, but it was also difficult to obtain a list of Aural Training lecturers.[8]

In the *Directory of Music Faculties in Colleges and Universities, U.S. and Canada 1990-92*, 114 teaching areas are listed together with the names of teachers of subjects. Aural Training is, however, not listed amongst these subjects![9] Although it is most probably listed together with other subjects under headings such as "Rudiments" and "Theory and

6 A list of the South African universities with music departments was supplied by the South African Embassy in Bonn.

7 A list of *Musikhochschulen* was found in the **Musikalmanach 1990/91** published by the German Music Association, Regensburg: Gustav Bosse, 1989, pp. 246-259. A supplementary list of the *Musikhochschulen* in the former East Germany was received from the president of the German Music Association, Prof. Dr. Franz Müller-Heuser. Responses from directors of *Musikhochschulen*, as well as names published in different Lecture Directories (*Vorlesungsverzeichnisse*), were used to compile a list of German Aural Training lecturers.

8 According to the lists of Music Schools and Departments in **Musical America - International Directory of the Performing Arts** (1988 p. 470 - 504), there are about 500 universities with music departments in the United States of America. If it is assumed that there are approximately 3 to 5 Aural lecturers per university, the total number of lecturers is 1500 to 2500.
Pembrook and Riggins found in their survey that the average number of teachers in Aural Training at a given institute (graduate teaching assistants included) ranged from slightly under 2 (schools with less than 50 music majors), to nearly 7 (schools with more than 200). In "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 233.

9 Catherine Butler (Ed.), **Directory of Music Faculties in Colleges and Universities, U.S. and Canada 1990-92**. Missoula, MT: CMS Publications, 1990.

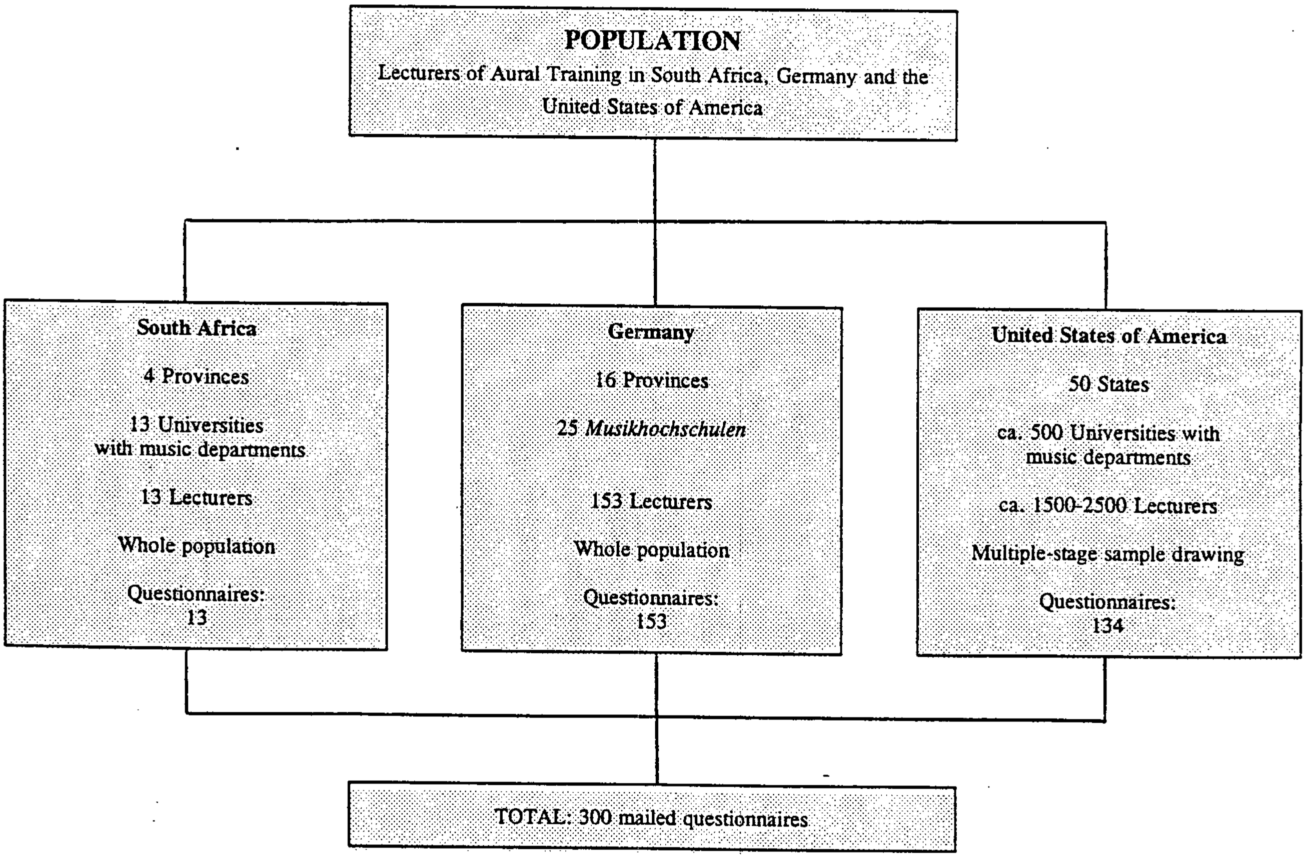
Analysis", it is impossible to discern from the list which teachers are responsible for Aural Training. A multiple-stage, pro-portional, stratified grouping procedure of sample drawing was therefore decided upon.[10]

In order to compile a list of Aural Training lecturers, the 50 states of the USA were taken as strata. Letters were sent to 150 heads of music departments, taking into account the proportional number of universities with music departments in each state.[11]. Responses provided 118 names (45 universities located in thirty states). This information was represented on a map in order to examine the distribution which was found to be satisfactory. Geographical location was thus used as a variable of stratification.

Questionnaires were sent to the 118 lecturers as well as to 16 universities in the states that did not respond to the first letter. In total 134 questionnaires were mailed to lecturers in the USA.

In the following diagram a summary of the USA sample design is presented, as well as information on the populations used for the RSA and FRG:

Fig. 3.1 Summary of sample design



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10 D.J. Stoker, "Basiese Steekproefnemingsmetodes" in J. Schnetler (Ed.), **Opnamemetodes- en praktyk.** Pretoria: Human Sciences Research Council, 1989, pp. 112-119.

11 Names and addresses of music departments were found in: Shirley Fleming (Ed.), "Music Schools and Departments" in **Musical America - International Directory of the Performing Arts**, 1988, p. 470 - 504.

3. RESULTS, DISCUSSIONS AND CONCLUSIONS

The sum of lecturers that completed the questionnaire (representative of all three countries) was 134 (45%). Five questionnaires were received back after the calculations had been done and were not taken into account. The actual sum of questionnaires used in the calculations was 129 (43%). The response rates for the individual countries were as follows:

▪ RSA	7 (54%)
▪ FRG	69 (45%)
▪ USA	53 (40%)
▪ ALL (Overall response rate)	129 (43%)

The seven respondents from the RSA represented seven different universities located in three provinces. In the FRG, 23 *Musikhochschulen* located in all sixteen provinces, were represented by the 69 respondents. The 53 respondents from the USA represented 44 different universities located in 27 states.

Although these percentages seem low, the distribution of responses in the various countries is sufficiently convincing. The maps and lists presented in Appendix F provide proof of this. Furthermore, the whole population of Aural Training lecturers was taken into account for the South African and German parts of the survey and not just a sample, as is the case in most research endeavours. One should be cautious about generalizations based on the findings for the USA because the response rate was 40%, and a 10% sample was drawn from the population of Aural Training lecturers. The possibility of sampling bias in the USA findings can thus not be ruled out.[12] A reason for the 40% response rate could be that this questionnaire was the fourth of its kind received by some respondents within a ten-year time-frame.

All calculations were done with the SPSS computer software package (version 4.0; 1990) on the COMPAREX 7188 computer at the Center for Data Processing, University of Tübingen. Mainly frequencies and percentages were calculated. In isolated cases, relationships between questions were examined by means of cross-tabulation calculations. Harvard Graphics software (version 2.10; 1987) was used for drawing the graphs.

An example of the English version of the questionnaire, a detailed presentation of the results of each question and the respondents' comments are presented in Appendix G.[13]

In the following discussions of the results, reference is made to:

3.1 The objectives of Aural Training
3.2 Organisational aspects
3.3 Methodological aspects
3.4 Teaching materials and attitudes towards research
3.5 Non-computer-assisted Aural Training (NCAT)

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12 Collins, in a similar questionnaire-based survey, indicated a response rate of 67%. Killam indicated 53% and Pembrook and Riggins 37%.
Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 231 and 233.

13 The Afrikaans and German translations of the questionnaire and accompanying letters appear in Appendices H and I.

3.1 The objectives of Aural Training

The question on the goals of Aural Training consisted of two parts. Firstly, respondents had to indicate whether they saw Aural Training as a subject that mainly supports instrumental, singing and music theory courses (as a subsidiary subject), or as a subject with its own goals. Secondly, respondents who chose the latter had to comment briefly on the goals that they pursued.

According to the results, 57.1% of the respondents in the RSA saw Aural Training as a subject that merely supports other subjects, whereas the majority of respondents in the FRG (53.6%) and the USA (58.5%) indicated that it is a subject with its own goals. The practical hypothesis *Aural Training is looked upon as a subject that merely supports other subjects* could be accepted as true only for the RSA, and had to be rejected for the FRG and USA. However, the fact that there was only a minor difference of 10.8% in the overall response frequencies between the *merely support* (44.2%) and *subject with its own goals* (55%) answers, revealed a lack of conformity among lecturers on the fundamental goal of Aural Training.

The respondent's comments to the second part of the question were analysed and grouped together into ten different categories:

The development of structural hearing: Cognizant analytical hearing; Recognition of musical cohesion; Structural meaning of material; Aural analysis as a subject with its own status - verbalising and embodying (to objectify) the estimated impression ("Verbalisierung u. Objektivierung d. flüchtigen Höreindrucks"); Development of structural criteria through hearing/also non-schematic perception of New Music; Recognition of form schemes; Conscious understanding of musical relationships in detail and in bigger form schemes; Recognition of compositional and historical attributes; Means of developing organisation; Schooling of analytical and intuitive hearing; To process sound as meaningful patterns.

The development of inner hearing: To develop the "hearing eye" and "seeing ear"; It should help musicians to internalise music; Improvement of interrelations of notation and sound; Awareness of sound imagination; Being able to look at music and hear it, to hear music and be able to write it down; Development of imagination; To create a musician who can function without an instrument; To think sound, to hear it mentally, to listen with an "inner ear'; To aid the visual-aural perception of music.

The development of hearing strategies/hearing patterns: Development of hearing strategies; Availability of thinking patterns; Systematic work through of the musical elements; Schooling in applying learning patterns; Development of musical memory, coordination, concentration.

Statement: Aural Training is the basis of all musical activities: Aural Skills are fundamental to all aspects of active musical performance. After all, music is by definition an "aural" art!; It controls the entire perception of music; Aural training is a central part/most important part of any musician's training; Aural Training is significant in every aspect (performance or evaluation) of music; Ear Training is the basis of all reading and writing. Without it, communication is almost impossible; The ability to hear has to do with the whole human being, his personality in the broadest sense.

The development of musical understanding: To improve musical understanding, Conscious hearing, Musical sense; Trains knowledgeable listening; The essence of musicianship is involved in the mental integration of sound, symbol and label.

The development of musical perception: Improve music perception; Sensitization of the ear with reference to all the musical parameters; Sharpen recognition skills; To fine-tune discriminatory ability; Schooling of musical perceptive consciousness; Control over sound influences on the musical ear.

The development of musical literacy: To improve musicianship; To learn the language of music expressed through sound; An increase in musical awareness, sensitivity to musical experience, for listeners/performers; Development of music literacy; Development of musical independence; Development of creative abilities through hearing; Intensify aural acuity.

The development of practical skills: Sight-singing, score reading, pitch-tuning, timbre, pitch and rhythm discrimination, error detection, correction listening, intonation, performance skills with other students, reproduction of what is heard, harmonic discrimination, discrimination between major and minor, evaluation skills, etc., recognition of intervals, sensitivity to the tonal system, dictation and playing what has been heard, reproduction of what has been heard, either vocally, verbally or in written keyboard form, evaluative hearing - ability to criticise.

To also support other music courses: Theory and Ear Training are "co-requisites" but the contents are not the same. Ear Training moves at a slower pace; A tough question to answer as it is, to me, both goals. However, (b) perhaps comes out on top; Aural Training will always be related to the musical practice, and in the same way to theory. That is why I fought (successfully) against this distinction between "Theory" on the one hand, and "Aural Training" on the other hand. I am principally against the education of "desk-drawer-thinking"; Does support performance and theory; In a sense, that is a supporting role to one's career; ... of course this should lead to the goals in (a) above; Thus it supports/is basis to serious study of music; Aural Training forms the basis for other subjects, and other subjects form the basis for Aural Training. Why (a) or (b)?; I cannot divide (a) and (b); I cannot separate the two. Structural understanding of music as mental procedure will always support special instruction e.g. technical support for performances as well as in interpretative matters According to (a): Hearing is biased in the field of Music Theory through historically influenced errors ("Root-hearing"). According to (b): Hearing as subject with its own goals should be seen as a corrective of (a), but needs a Music Theoretical historical basis. Both (a) and (b) require each other.

Other: Other specific goals and remarks that do not necessarily deal with goals, were put in this category: The shaping of the aural ability in the direction of music aesthetics (FRG); Practice of music therapy (FRG); Consonance-dissonance problem (FRG); I do not see Aural Training as a subject with its own goals. It is always at the service of music and music research (RSA); Main subject: Aural Training ("Hörerziehung") (FRG); Aural Training can have its own purposes for a few people who would like to develop Aural Training in a scientific way (FRG); "Basis subject, such as harmony and counterpoint. In contrast to harmony and counterpoint that work with the brain and manuscript paper, (pardon - this is very much shortened!) Aural Training is dependent on perception only (FRG); It sometimes happens that I construct my music theory teaching only through hearing (FRG); To enable each student to reach the optimum in his hearing ability (USA); Development of personal aural skills (I describe it as a "3rd instrument to be practised daily) (RSA); Aural Training's goal is to develop the musical ear (FRG).

The purpose of having the respondents commenting on the goals was not so much the measurement of frequencies for each goal, than to be able to distinguish different goals pursued by lecturers. All these goals are related to each other which made classifying them difficult. The development of structural hearing leads, for example, to the development of musical understanding. To be able to understand music, one first has to be able to perceive music. The extent to which music has been perceived and understood is manifested in the reading and writing of music in all its different forms. The following quotation summarises the complex intertwined character of the goals of Aural Training:

> "Whoever has accomplished the goal of Aural Training, understands the inner structures of the music that he has heard in such a way that he can inform others about it. The proof of this understanding lies in different forms of communication such as: in a written form - the music in question can be put into notation; in a practical form - to sing or play from memory what was heard; in a verbal form - to describe what was heard with the help of music theory terminology. Each of these communication forms captures only one aspect of music. This is a requirement not only for communication, but also for analysis. Through this activity the perception of music is enriched and refined. It is interesting that reference is not made to real-time music, but always to the inner imaginary memory, and sometimes reference is made to newly created

music. The hearer learns to know 'what' is sounding in his inner ear. That is the goal of Aural Training."[14]

Apart from the results of the RSA where a fairly large majority of the respondents (66.7%) indicated the development of musical perception, other less obvious but nevertheless interesting trends were observed. The majority of FRG respondents (45.9%) indicated that one of their goals was to develop structural hearing. This complies with observations made at different *Musikhochschulen* where aural recognition of harmonic structures played an important role, and subjects such as *Aural Analysis* were included in the curricula. The influence of the writings by Bruce Benward on the "hearing eye" and the "seeing ear" could be seen in the 35.5% of the USA respondents indicating the development of inner hearing.[15] There was also a tendency amongst the majority of all respondents (36.6%) to indicate that aural skills should, apart from other goals, support other music courses. This could be a sign that a more comprehensive approach was desired by some respondents.

Reasons for the diversity of opinions on the fundamental goal of Aural Training (subsidiary subject or subject with its own goals) can be sought in different teaching philosophies and/or in the inadequate training of many Aural lecturers. Robert Gauldin observed that basic musicianship at the college level was often taught by lecturers not interested in the subject, which led to unsystematic teaching approaches.[16] A German respondent commented that, although he gladly supported the research project, he was not a suitable person for answering questions on Aural Training. He did not see the teaching of Aural Training as his vocation, and only taught the subject because the director, who was a personal friend, asked him to assist in a difficult situation.

Roland Mackamul stated at two different conferences in 1977 and 1982, that Aural Training teachers with sound pedagogical credentials were scarce and that teaching jobs often provided an initial financial support for young composers.[17] Hans-Dieter Resch stated that lecturers familiar with the newest methods and research results of Aural

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14 Researcher's translation of a comment by Prof. Hubert Haas in an interview on 7 November 1988.
"Wer am Ziel der Gehörbildung angekommen ist, versteht Musik, die er gehört hat, in ihren Strukturen so genau und bewußt, daß er Andere darüber informieren kann. Dieser Nachweis, verstanden zu haben, kann in verschiedenen Arten der Kommunikation geführt werden: schriftlich - die betreffende Musik in Noten setzen; praktisch - aus dem Gedächtnis nachsingen oder nachspielen; oder sprachlich - mit theoretischen Begriffen definieren. Jeder dieser Kommunikationsweisen hält jeweils nur einen Teilaspekt von Musik fest, das ist eine Bedingung von Kommunikation, aber auch eine von Analyse. Darüber hinaus wird durch diese Tätigkeiten die Wahrnehmung von Musik in hohem Maße bereichert und verfeinert. Interessant ist, daß es sich dabei nicht um momentan konkret klingende Musik handelt, sondern immer um die innere Vorstellung erinnerter, manchmal auch neu erdachter Musik. Der Hörer lernt immer mehr, zu wissen, 'was das ist', das in seinem Innern klingt. Das ist das Ziel von Gehörbildung."

15 Bruce Benward, **Sightsinging Complete**. Dubuque: Wm.C. Brown, 1980 p. vii.

16 Robert Gauldin, "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 75-90.

17 Roland Mackamul, "Effektivitätsmindernde Faktoren im Bereich der Gehörbildung" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 pp. 15-19.
Roland Mackamul, "**Gehörbildung - wo und wann (I)?**" in **Schweizerische Musikzeitung**, 123/2 (March/April 1983) p. 99.

Training were needed. He also recommended that Aural Training be taught in such a way that students could become acquainted with current methods in order to use them in their own teaching.[18]

Although a German respondent stated that outstanding teachers were teaching at his *Musikhochschule*, and that the reason for students' lack of interest could be attributed mainly to their negative attitudes towards the subject, he left room for the fact that the problem might also lie in the teaching system. The same respondent commented on his own experiences as an Aural Training student:

> "Were my current skills in aural understanding developed through the Aural Training I received as a student? If so, then only to a small extent. I then, in my thinking, made use of 'guitar grip images'. (It is only later that I did not need these anymore.) I learnt my ability of abstract thinking elsewhere."[19]

Werner Pütz in all fairness asked whether the cause for the general uneasiness towards Aural Training on the side of the student did not lie deeper than inadequate methods.[20] A German Aural Training lecturer, for example, expressed his concern that the visit paid by the researcher at that particular institution in 1989 was two years too early. He was still developing his Aural Training system. The question on the goals to be achieved after the two-year period was, however, not clearly answered.

In a survey on students' viewpoints on the effectiveness of Aural Training, Shey-Tzer Yao found that only 52.8% understood the instructional goals and objectives. On the question whether the teacher communicated the teaching goals clearly at the beginning of the lessons, only an average of 32.2% responded positively. Confusion regarding instructional objectives normally leads to unsystematic teaching procedures. This could be seen in the students' responses on the question whether aural skills training material was compiled systematically. Averaged responses for both institutions examined were: Yes - 26.6%; No - 37%; No idea - 35.9%.[21]

As a result of inadequate aural teaching systems and teaching approaches, primary and secondary music teachers concentrated mainly on producing technically trained instrumentalists with an underdeveloped musical

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18 Hans-Dieter Resch, "Gedanken über eine systematische Gehörbildung im Instrumentalunterricht" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 85.

19 Researcher's translation of "Sind mein jetzigen Fertigkeiten in auditivem Erfassen durch den damaligen Gb-Unterricht mit aufgebaut worden? Ich mein wenn, dann zum geringen Teil. Damals dachte ich in von der Gitarre vorgegebenen Griffbildern, (erst viel später brauchte ich ihr Griffsystem nicht mehr.) Meine Abstraktionsfähigkeit habe ich anders gelernt."

20 Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung**, 63/5 (May 1972) p. 232.

21 Shey-Tzer Yao, **The Aural Skills Development Program in Music Departments of Two Post-Secondary Institutions in Taiwan: Status and Recommendations.** Doctoral dissertation, Ball State University 1990. Ann Arbor, Michigan: University Microfilms International, 1990 pp. 74, 55 and 61.
The question can be asked if results from Asian countries can be discussed together with results gathered from Western music institutions. It is, however, a well-known fact that music studies in Japan and Taiwan are very much influenced by Western music traditions, a fact which can be seen in the 84% of the students who indicated that the teaching material excluded traditional Chinese music.

consciousness.[22] This snowballed further in that students did not meet the required standards of the aural entrance examinations at *Musikhochschulen* and universities. In an interview in 1989, Professor Markus Ulbrich of the *Staatliche Hochschule für Musik Freiburg* voiced his concern that many illiterate students (musically speaking) begin to study music without adequate music reading and writing skills. This aspect has also been commented on by the German and American authors Pütz, Marbaix, Ganter, Vetter, and Wennerstrom.[23]

Although no written evidence of poorly prepared students embarking on a B.Mus or B.A. degree at South African universities could be found, the researcher witnessed this problem as a teaching assistant at two different universities in the RSA.[24] Bernita Douglas also stated that Aural Training had been partially neglected in the general South African music education situation, and more specifically in piano instruction on an elementary level.[25] This disregard of the importance of Aural Training will definitely produce inadequately prepared prospective music students. Some of the results obtained in a seven-year longitudinal survey at the Universities of Stellenbosch and Cape Town on musical aptitude were therefore not surprising. Not only did students at both institutions scored noticeably lower in the Musical Sensitivity part than in the other two parts of Gordon's *Musical Aptitude Profile*, but the correlations

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22 Only a few articles and Aural Training books were written for young musicians. One book on the development of music literacy starting with newborns and young children was also found:
Arpad Darazs and Jay Stephen, **Sight and Sound - Visual Aid to Melody and Harmony.** Oceanside, New York: Boosey and Hawkes, 1965.
Ernst-Günter Fischer, "Möglichkeiten und Grenzen einer musikalischen Grundschulung der Sieben- bis Vierzehnjährigen" in Josef Mayr-kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1977 pp. 73-75.
Valentino Ragni, "Gehörbildung in der vorschulpflichtigen Musikerziehung" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987 pp. 49-55.
Edwin E. Gordon, **A Music Learning Theory for Newborn and Young Children.** Chicago: G.I.A., 1990.

23 Werner Pütz, "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung**, 63/5 (May 1972) p. 232.
Marcel de Marbaix, "Rhythmisches Erfassen bei der musikalischen Grundschulung"; Claus Ganter, "Bewußtes Hören - Musiktheorie als Hörhilfe"; Hans-Joachim Vetter, "Studienvorbereitende Ausbildung an Musikschulen in der Bundesrepublik", all in Josef Mayr-kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976. Regensburg: Gustav Bosse, 1977** pp. 27, 59 and 67.
Mary H. Wennerstrom, "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 163.

24 At most South African universities with music departments additional Aural Training entrance tests are not required if students meet the other set requirements.

25 Bernita Douglas, **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig.** Unpublished Master's thesis, University of Stellenbosch 1990 pp. 1-2.

between the sensitivity part and achievements in Aural Training were also very low.[26] The purpose of the sensitivity test is to choose the best artistic performance of two played musical phrases. The fact that students scored lower in this section of the test showed that they were merely technically trained instrumentalists.

Because of the musical illiteracy on the side of students, the first level of Aural Training at tertiary institutions mainly concentrates on rudimentary aspects such as intervals, scales and primary chords.[27] This again leads to primary and secondary level teachers barely being able to rise above the elementary aural level.

In order to solve this problem, entrance requirements have been raised at some music departments.[28] Remedial courses have been offered at a few universities in the USA,[29] and a number of *Musikhochschulen* offer preparatory courses.[30] However, in the survey of the *Institute for Music Theory Pedagogy II*, only 35% of the respondents indicated that their theory programme had a preparatory division.[31]

Advanced solfège courses and assistantship programmes have been recently offered at some USA universities, concentrating on music psychological aspects, the reformulation of traditional instructional practice to reflect the cognitive process theory, and concepts of assessment designed to take into account these new perspectives. These courses aim to provide the necessary background and experience for teaching Aural Training at any level.[32] Also

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26 Paul Loeb van Zuilenburg, "Die Gebruik van Gordon se 'Musical Aptitude Profile' by die keuring van Voltydse Musiekstudente van die Universiteite Stellenbosch en Kaapstad" in **South African Journal of Musicology**, 11 (1991) p. 48, as well as information not included in the article. The researcher acted as a research assistant under the guidance of Dr. Loeb van Zuilenburg.

27 Examples of entrance tests and final examination requirements appear in Appendix J.

28 Roland Mackamul, "Gehörbildung - wo und wann?" in **Schweizerische Musikzeitung,** 123/2 (March/April 1983) p. 99.
Mary H. Wennerstrom, "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy,** 3/2 (Fall 1989) p. 163.

29 David Ward-Steinman, "Comprehensive Musicianship at San Diego State University" in **Journal of Music Theory Pedagogy**, 1/2 (Fall 1987) p. 137.
In a survey conducted during the *Institute for Music Theory Pedagogy*, the following responses were given to the question "If students do not meet the expectation, how are they prepared to enter the theory sequence?"
- credit rudiments course which counts only as elective (24%)
- rudiments course for credit (21%)
- individual tutoring (19%)
- non-credit rudiments course (17%)
- other (19%)

Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 246.

30 The Aural Training introductory course offered by Ursula Flinspach at the *Stuttgarter Musikschule* as well as weekend and summer courses serve as an example of this. Preliminary courses are, for example, also presented at the Musikhochschule des Saarlandes. Hans Lonnendonker, "Musiktheoretisches Grundstudium an der Musikhochschule des Saarlandes in Saarbrücken" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978 p. 47.

31 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 249.

32 Lyle Davidson, Larry Scripp and Joan Meyaard, "Sightsinging at New England Conservatory of Music" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) p. 8.

trying to compensate for the need for qualified Aural lecturers, some German *Musikhochschulen* provide students with the opportunity of choosing Aural Training and Music Theory as a second major subject. At the *Hochschule der Künste* in Berlin the researcher observed that students majoring in Aural Training had to give "trial" lessons to junior students. (An example of such a lesson appears in Appendix K.) Aural Training major students at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart* are required to attend a colloquy where methodological issues are discussed.

No advanced courses of Aural Training were available in the RSA. According to information gathered by Naudé, extra courses on the didactics of Aural Training are not the norm. This field was normally covered "incidentally", as one lecturer mentioned, in a general methodological subject on various music disciplines. At the *University of Stellenbosch*, a one-semester course on the methodology of Aural Training was offered to students majoring in Music Education.[33]

Although the problem of not having enough thoroughly qualified lecturers has been recognised by a few institutions, there is still a valid need for a broader recognition of this phenomenon in order to provide lecturers with sound pedagogical credentials and a larger consensus as to the fundamental goal of Aural Training and the specific goals to be strived at. This will result in prospective students being well prepared.

3.2 Organisational aspects

The organisational aspects addressed in the questionnaire were curriculum planning with regard to "isolated" or comprehensive (integrated) Aural Training, weekly instruction time available per student, sufficiency of instruction time, form of instruction (individual/group classes), sizes of the groups, preferences regarding the form of instruction and group size, and the availability of assistants for practice and/or remedial purposes.

Regarding **the position of Aural Training**, it is clear that it was treated as a separate subject in all three countries. The results indicated that 85.7% of the lecturers in the RSA, 76.8% in the FRG and 71.7% in the USA (overall response rate 75.1%) taught Aural Training as separate classes within the music curriculum.[34] The practical hypothesis *Aural Training is treated as a separate subject in the curricula of tertiary institutions* was thus proved to be true.

Compared to the RSA and USA results (14.3% and 1.9% respectively), it was conspicuous that 20.3% of the German respondents indicated both "isolation" and "integration". This could imply .that subjects other than instrumental performance may fall under the domain of Music Theory, as was often the case in the USA, but received

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33 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987 pp. 245-257.

34 Pembrook and Riggins found in their survey that 60% of the responding schools in the USA scheduled separate classes for Aural Training while 37% incorporated aural skills into other classes, for example written theory. Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 233.

separate treatment.[35] On the other hand, it could also reflect a more comprehensive approach where Music Theory is taught from an aural point of view, and where Aural Training is taught as applied Music Theory. One German respondent, for example, explained that it sometimes happened that he constructed his music theory teaching merely through listening. Other examples of comprehensive approaches in Germany could also be seen in the occasional presentation of subjects such as Aural Analysis (*Höranalyse*).[36]

Although a comprehensive approach was pursued at certain universities in the USA, only two USA respondents mentioned this, and only one respondent indicated both *separate subject/course* and *part of the Music Theory Classes*. One RSA respondent indicated both, and one German respondent pointed out that Aural Training also formed part of a rhythmic education course (Jaques-Dalcroze Eurhythmics) taught at *Musikhochschulen*. According to the Pembrook-Riggins survey, a number of respondents who taught in integrated programmes preferred separate classes and vice versa. Their general conclusion was that the pendulum had swung away from the integrated approach favoured at the beginning of the 1980s.[37]

In all three countries a comprehensive approach to Aural Training was seemingly relinquished in favour of an "isolated" approach. No further questions appeared in the questionnaire as to the nature of this isolation. It is possible that, although curricularly scheduled as a separate subject, a comprehensive teaching approach was followed. Observations in both the RSA and FRG, as well as the results of the applied Aural Training methods discussed in the next section, however, revealed that cross-references to other subjects were made only *occasionally* and that the subject was treated in isolation, concentrating merely on drill and practice.

The fact that Aural Training was acknowledged as a subject in its own right, however, does not reflect its degree of recognition and status. In a survey conducted during the *Institute for Music Theory Pedagogy II* in the USA, a question was asked on the percentages apportioned to Aural Training in examinations when written and aural skills were under one course number. The majority of respondents (28%) indicated a percentage of approx. 25%. Only 23% of the respondents indicated approx. 50%.[38] Damshroder complained that at the university where he taught only one credit was given to Aural Training compared to the four credits given to theory.[39] Also, for examination

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35 According to the Lecture Directory of the *Hochschule für Musik Würzburg 1991*, the subjects Instrumentation, Aural Training, Figured bass and Harmony and Counterpoint fall under the domain of Music Theory.
Mary H. Wennerstrom, "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 153-176.
Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 pp. 3-5.

36 The presentation of these subjects was discussed thoroughly in Chapter Two under the heading of *Isolation vs Integration and Comprehension*.

37 Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 239.

38 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 248.

39 David A. Damschroder, "Flexibility in the Theory Classroom: Strategies for the Management of Diversity" in **Journal of Music Theory Pedagogy,** 3/2 (Fall 1989) p. 185.

purposes at some South African universities, Aural Training formed a sub-minimum of 10% - 40% of another "linked" subject.[40]

It is therefore not totally surprising that students seemed to look down on this subject and did not invest much time in mastering essential skills necessary to be a literate musician. A few respondents indicated in the Pembrook-Riggins survey that Aural Training was not fully appreciated by many students, teachers and administrators. This fact was also supported by Collins.[41] One German respondent spontaneously mentioned that the same trend could be noticed at his *Musikhochschule*:

> "Aural Training is for - I dare say - all students the most "subordinate" subject of all. Because of this, most lecturers only try to help students to pass the final aural examination. ... We as lecturers will have to accept the fact that this instruction possibility - now as then - will not be used optimally. Responsible for this are the human weaknesses of the students, as well as for example the fact that some Aural Training classes do not take place due to the many holidays during the summer semester, and because of many extra orchestral rehearsals."[42]

As to the **form in which instruction takes place**, the results undoubtedly showed that group tuition was practised by a large majority of lecturers in all three countries (RSA 100%, FRG 79.7%, USA 96.2%, ALL 86%). Only 10.1% (ALL) made use of both individual and group tuition. Reasons for the application of group tuition were that individual training was not cost effective and did not motivate enough (RSA). Furthermore, polyphonic music could be sung in group classes (FRG).

In comparison to the fact that group tuition was indicated as by a large majority of lecturers, the **ideal teaching situation** as perceived by 53.3% of all the respondents included both individual and group tuition. This discrepancy between reality and preferences could be clearly seen in the responses of all three countries. One hundred percent of the RSA respondents indicated group tuition, whereas only 57.1% *preferred* this type of teaching, with 42.9% preferring both individual and group classes. The same situation existed in the FRG (reality - 79.7%; preference - 50.7%) and USA, with the biggest difference in the responses between reality and preference visible in the USA results. Although 96.2% of the USA respondents taught classes made up of groups, 75.5% preferred a mixture of individual and group tuition. It can be stated with certainty that the majority of lecturers were not satisfied with their organisational planning regarding teaching settings.

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40 Anna C. Naudé, **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987, pp. 245-257.

41 Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 239.

42 Researcher's translation of "Die Gehörbildung ist für - ich wage zu sagen: alle Studenten - das nebensächlichste Nebenfach überhaupt. Da es existiert, versucht jeder Lehrer, die Studenten soweit zu bringen, daß sie die Prüfung schaffen. ... Wir Lehrer werden uns damit abfinden müssen, daß diese Möglichkeit - wie eh und je - nicht optimal genutzt wird. Verantwortlich sind die menschlichen Schwächen der Studenten und z.B. der Umstand, daß im Sommersemester wegen der vielen Feiertage und der Verpflichtung zu Orchesterproben manche Gb-Stunde ausfällt."

With regard to the **weekly instruction time available per student**, both the majority of the respondents in the RSA (28.5%) and FRG (59.4%) indicated sixty minutes per week.[43] Thirty and forty-five minute classes were indicated by 15.9% of the FRG respondents in each of the two time categories. In the USA the majority of respondents (50.9%) indicated that two hours were available for aural instruction. Another 30.2% indicated three hour classes.[44]

Apart from commenting in brief words, two respondents reported in more detail on their curricula. One USA respondent described his first-year aural curriculum as consisting of four hours per week which were divided into two hours for Dictation (including composition exercises where the students were required to write musical materials according to given parameters and gave vocal performances of these away from the piano or sound source), and two hours Sight Singing material from the music literature using the solfège system. A German respondent at the *Staatliche Hochschule für Musik Freiburg im Breisgau* explained that Aural Training was taught in several classes such as: *Written solfège exercises* (tonal and atonal one part dictation): 120 minutes per week, two semesters long; *Verbal solfège exercises* (e.g. declamation of rhythms and sight singing): 60 minutes per week for a class of four students, or 15 minutes for individual classes once a week, two semesters long; *Harmonic hearing* as part of Music Theory classes: 60 minutes; *Two and three part dictation*: 120 minutes, two semesters long; *Non-mandatory subjects* such as "Live-dictation" - examples from the music literature in their original settings.

Observations made on the curriculum planning of Aural Training at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart* from 1988-1991 were as follows:

Individual Aural Training: 30 minutes per week
Practical group classes in the form of seminars I-III, 60 minutes weekly per class
Preparatory classes for students majoring in ML (instrumental music teachers), SM and KM (teachers for Music Education in general schools as well as students studying to become cantors): 60 minutes weekly per class; the preparatory classes should be taken in the last semester before the examination.
Tutorial: approx. 30 minutes per week
After a period of four semesters the examination for ML (six semesters for SM/KM) should be taken. The SM and KM examinations are more difficult than the ML examination.
Extra non-mandatory seminars on different aspects of Aural Training can also be attended.

At most *Musikhochschulen* in the FRG students took their final examination at the end of the four semester period, and had to sit additional entrance tests to major in Aural Training with Music Theory as a second major subject.

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43 It should, however, be kept in mind that 42.9% of the South African respondents did not answer this question. The reason for this is not clear. It could be that this aspect of the questionnaire was not considered to be important, or was overlooked.

44 This information complies with the survey by Pembrook and Riggins who found that 61% of separate freshmen Aural Training classes included 100 minutes of instruction, while 16% met for 150 minutes per week, ranging from 50 to 250 minutes per week. Overall responses averaged 177 minutes of instruction per week. The results for sophomore classes were similar with 57% indicating 100 minutes of instruction per week and 16% 150 minutes. (Mean average: 111 minutes per week.) Typical institutional degree requirements included 4 semesters. Only 4% of the separate classes were subdivided into specific classes for one aural skill (e.g. sight singing.)
Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 233.
Results from the *Institute for Music Theory Pedagogy II* also indicated a majority of 66% respondents having a four semester theory sequence. Six semester or more were only indicated by 15%.
Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 252.

According to observations made during study periods (1979-1983) and (1985-1986) at the Universities of the Orange Free State and Stellenbosch in the RSA, Aural Training courses had to be completed within three years (six semesters). Students had to pass tests and examinations administered on one level (within the duration of a year) to be able to move to the next level.

Based on respondents' spontaneous comments which appear in Appendix G, the above information and information taken from the USA Pembrook-Riggins survey, general trends could be recognised. First of all, the individual music departments followed diverse time schedules. Although trends of 60 minutes' instruction time per week were observable in the RSA and FRG results, and one 120 to 180 minutes in the USA results, this was only indicated by a narrow majority margin. Secondly, Aural Training was integrated into Music Theory classes of X minutes. Thirdly, the time available depended on the seniority of the students (USA), the level of development (FRG), and the subject in which the student majored (FRG). Fourthly, extra, non-mandatory classes such as, for example, Aural Analysis, additional Dictation classes and concentrated preparation for the final aural examination were available at some *Musikhochschulen*. Students could also attend more than one extra class during a semester. When a student made full use of this opportunity, he/she could have up to five hours of aural instruction at, for example, the *Musikhochschule* in Stuttgart. Fifthly, at several music departments in all three countries students had the opportunity of making additional use of programmed instruction facilities. Sixthly, at some music departments Aural Training was divided into smaller segments (e.g. Sight Singing and Dictation classes) taken separately. Seventhly, aural courses should have been be completed within a period of four to six semesters. Finally, students in the FRG could major in Aural Training and Music Theory as a second major subject at some *Musikhochschulen*, and students in the USA could move on to an advanced Aural Training class at some music departments. To the researcher's knowledge no such courses were available in the RSA.

The majority of respondents from the USA (73.6%), however, indicated that the available two to three hours of **instruction time** was not sufficient. In both the other two countries the majority of respondents found the instruction time sufficient (RSA: 57.1%, FRG: 49.3%). Seven respondents from all countries mentioned that the sufficiency depended on the developmental level of the student. For good students the time was sufficient and for weaker students insufficient.

It is conspicuous that there was only a marginal 8.7% difference between the "sufficient" (49.3%) and "not sufficient" (40.6%) answers of the FRG respondents. The instruction time could be sufficient when other, non-mandatory subjects were included in the syllabus, giving the student the opportunity of receiving up to five hours of instruction at some institutions. Yet, this aspect of non-mandatory subjects was not present at all *Musikhochschulen* and it can be assumed that these lecturers found the available instruction time insufficient. Comments by a few FRG respondents indicated that the time was insufficient:

> Not sufficient for students with inadequate entrance preparation (FRG); Not sufficient in sophomore year (USA); It's never sufficient unless on a daily basis (RSA); This is a complicated issue. The time is insufficient to give most, but not all, students a true mastery of the skills we are trying to promote in the courses themselves, term by term. But some students are actually able to achieve mastery in a much shorter time. For them, however, there is insufficient time to carry them to a true mastery of aural skills, hearing large-scale forms and key relationships, four-part polyphony, etc. (USA); Never enough (USA); Not ideally sufficient

(USA); Never sufficient but practical (USA); We are planning flexible instruction time - Brass and percussion students need more Aural Training - (They most often have the weakest ears!) (FRG).

The reason for the dissatisfaction with the time available on the part of the large majority of USA respondents could be partly related to the indicated group sizes, and the discrepancy between actual group sizes and preferred group sizes. More instruction time, on the other hand, was available which balances the differences between the countries. The fact that USA respondents were dissatisfied with the time available could therefore also be an indication that they put a higher value on the development of musical understanding through Aural Training than in the other two countries. This speculation can be supported by the increasing number of articles published in American Journals and other subject-related periodicals, as well as by the two conferences held on Aural Training by the *Institute for Music Theory Pedagogy* in 1989 and 1992.

Questions on the actual and preferred sizes, cross-tabulation calculations between the *time-available question* and the *group sizes question*, as well as respondents' comments revealed that:

(a) The group sizes in the USA were significantly larger than the sizes indicated in the RSA and FRG. The majority of the USA respondents indicated groups sizes of 11-12 (18.9%), 13-15 (32.1%) and 16-20 (26.4%), thus ranging from 11-20. It is also interesting to note that, although not the norm, only in the USA groups larger than 30 students per group were indicated by four respondents. One respondent indicated that groups of 100-160 met for two hours per week! Group sizes in the other two countries were significantly smaller. The majority of the RSA respondents indicated group sizes of 5-6 (42.9%) and 9-10 (42.9%), thus ranging from 5-10. In the FRG the major group sizes were 2, 3-4 (in both cases 15.2%), 5-6 (31,8%), 7-8 (15.2%) and 9-10 (22.7%), thus ranging from 2-10.

Small groups were *preferred* in all three countries: RSA 5-6 (42.9%) and 7-8 (28.6%); FRG 2-3 (17.4%), 4 (20.3%) and 5-6 (33.3%); USA 9-10 (30.2%) and 11-12 (26.4%). The differences between reality and preference were very small the RSA and FRG. It can be concluded that lecturers in the RSA and FRG were satisfied with their group sizes. The majority of respondents in the USA, however, preferred smaller groups than the actual 9-20 students per group indicated earlier.

(b) In the RSA the majority of 28.6% of the respondents had groups of 8-10 students in 60 minute classes. In the FRG the majority of 43.5% respondents indicated groups of 2-6 students in a 45-60 minute class. Another 34.8% indicated that they had 7-12 students during a weekly 45-60 minute class.

In comparison to the RSA and FRG results, cross-tabulation calculations revealed that groups of 13-20 students received 120 minutes per week aural instruction in the USA (32.1%).

(c) The degree of achievement influenced the size of the group and different tasks required different group sizes. Smaller groups were involved in classes which included performance skills such as Sight Singing and other oral assignments (ALL). Written assignments such as Dictation and Aural Analysis seminars were taught in larger groups (ALL). One RSA respondent indicated that he divided the two-hour instruction time per class into three portions: a larger group for seminars (30 students), a smaller group for practical work (15 students doing, for example, Sight Singing, rhythm declamation, keyboard harmony) and a very small group for extra drill with a teaching assistant (5 students).

A final curricular aspect addressed was the presence of **teaching assistants** to help weaker students or to act as practice partners. From the overall response percentages it was clear that 53.5% of the lecturers in the three countries did not have teaching assistants. Only 42.9% of the RSA and 33.3% of the FRG respondents answered positively to this question. The majority of 58.5% of the USA respondents, however, indicated that they do have teaching assistants.[45] Reasons for not having assistants, based on the comments by respondents, were that courses could be repeated (FRG), and individual extra instruction for weak students was taken over by the lecturers themselves (FRG). The costs involved (FRG) and the additional offering of computer-based reinforcement were also mentioned (ALL).

Regarding the organisational aspects of Aural Training, it can be concluded that although Aural Training has reached the stage where the majority of respondents have recognised it as a subject important enough to be scheduled separately in the music curriculum, much pioneering work should be done in order to help students and lecturers realise that it has the *same* value as other theoretical and practical subjects. Although classes were presented as group tuition in all three countries, respondents preferred a mixture of individual and group tuition. A small majority of respondents in both the RSA and FRG was satisfied with the available instruction time. The USA respondents, however, indicated that it was not sufficient, a fact that could be related to the larger group sizes. It can furthermore be concluded that the instruction time was not *ideally* sufficient in all countries, i.e. not sufficient to lead most students to the "true mastery of aural skills". Sufficiency depended on outside factors such as pre-university preparation, number of semesters, availability of non-mandatory subjects, group sizes and achievement levels.

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45 The results for the USA comply with the results of the *Institute for Music Theory Pedagogy II* where 56% of the respondents indicated that they had teaching assistants. As to the role of this assistance, the outcome was as follows:
Tutor individual students (89%); Lead drill or 'help' sessions outside the regular class meeting time (59%); Lead drill sessions in aural skills in the absence of the primary instructor during the class meeting time, either occasionally or regularly (54%); Assist in theory instruction with the primary instructor during the class meeting time either occasionally or regularly (30%); Teach theory sections in the absence of the primary instructor either occasionally or regularly (54%); Assist in the grading of papers (46%).
Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 249-250.

3.3 Methodological aspects

This section of the questionnaire mainly addressed methodological issues on the nature and variety of methods included in Aural Training. Whereas one question dealt with all methods that could possibly be applied, the other questions focused on two single components, namely Sight Singing and Aural Analysis. The main reason for this was that all other methods are related to inner hearing and structural thinking. Procedures for teaching Sight Singing and reasons for neglecting Aural Analysis, as well as the style periods used in the latter, were surveyed.

As to the nature of these questions, no further information was gathered concerning the details of the different methods indicated. The exact procedures of the dictation of a melody was, for example, not examined. The methodological aspect of Aural Training is a very personal matter, and it seemed impossible to formulate questions in such a way that they would have covered all the different nuances of teaching and still be statistically manageable. Such an investigation requires a different type of research which includes observations of Aural Training classes at tertiary institutions, as well as a thorough study of the methods used in published and unpublished sources, as was done in Chapter Two.

The efficiency of one method compared to another can also be statistically investigated, in that results obtained by subjects in a pre-test are correlated with the results obtained in a post-test after they have received different types of instruction. The survey conducted by Beverly Ann Martin is an example of such research procedures.[46] Gary Potter observed twenty-five subjects taking dictation,[47] whereas Gary Karpinsky made use of a case study method of a few students who exhibited representative deficiencies in order to draw conclusions on students' "dictational" behaviour.[48]

The first methodological aspect to be discussed is the different methods indicated by the respondents. An overview of the results appears in the following Table:

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46 Beverly Ann Martin, **The Effect of Hand Signs, Verbal Tonal syllables, and Letter Representations of Tonal Syllables on the Verbal and Symbolic Acquisition of Tonal Skills by First Grade Students.** Doctoral dissertation, University of Oklahoma 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

47 Gary Potter, "Identifying successful Dictation Strategies" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 63-71.

48 Gary S. Karpinsky, "A Model for Music Perception and Its Implications in Melodic Dictation" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 191-192.

Table 3.1 Response frequencies of indicated Aural Training methods

	RSA	FRG	USA	ALL
Hand signs (Tonic doh)	2 (28.6%)	10 (14.5%)	5 (9.4%)	17 (13.2%)
Indication of meter/beat	5 (71.4%)	24 (34.8%)	32 (60.4%)	61 (47.3%)
Conducting using free gestures	0 (0%)	3 (4.3%)	3 (5.7%)	6 (4.7%)
Other movements	2 (28.6%)	2 (2.9%)	2 (3.8%)	6 (4.7%)
Singing material that was heard	7 (100%)	58 (84.1%)	40 (75.5%)	105 (81.1%)
Clapping/intoning material that was heard	5 (71.4%)	47 (68.1%)	25 (47.2%)	77 (59.7%)
Playing on keyboard instruments material that was heard	5 (71.4%)	36 (52.2%)	12 (22.6%)	53 (41.1%)
Playing on other instruments material that was heard	2 (28.2%)	11 (15.9%)	7 (13.2%)	20 (15.5%)
To clap rhythms from sight	7 (100%)	50 (72.5%)	41 (77.4%)	98 (76.0%)
Sight Singing	**7 (100%)**	**60 (87.0%)**	**53 (100%)**	**120 (93.0%)**
Dictation	**7 (100%)**	**63 (91.3%)**	**52 (98.1%)**	**122 (94.6%)**
Error detection	6 (85.7%)	46 (66.7%)	36 (67.9%)	88 (68.2%)
Improvisation tasks	2 (28.6%)	24 (34.8%)	12 (22.6%)	38 (29.5%)
Graphic representations	2 (28.6%)	21 (30.4%)	18 (34.0%)	41 (31.8%)
Verbal descriptions making use of music theory terminology	6 (85.7%)	55 (79.7%)	37 (69.8%)	98 (76.6%)
Verbal descriptions making use of self-developed terminology	2 (28.6%)	22 (31.9%)	4 (7.5%)	28 (21.7%)
Transposition	1 (14.3%)	5 (7.2%)	0 (0%)	6 (4.1%)
Aural Analysis	1 (14.3%)	5 (7.2%)	1 (1.9%)	7 (5.4%)
Imagination tasks	0 (0%)	6 (8.7%)	0 (0%)	6 (4.7%)
Other methods	3 (42.9%)	11 (15.9%)	4 (7.5%)	18 (14.0%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

Other methods included the use of rhythmic solfège syllables; the playing of rhythms on students' own instruments and xylophones; combinations of hands, feet and voice; completion of antecedent-consequent phrases in a written form or through improvisation; Transcription from recordings; Interval and chord recognition; Combination of theoretical knowledge and practical experience, e.g. four-part harmony: SAB are dictated and the tenor should be composed according to four-part harmony theory rules. The original SATB example is then played in order to check and correct the tenor; To play one or more voices while singing another voice; Texture and timbre discrimination; Memorising melodic/rhythmic patterns; To sing modulation exercises, e.g. the last notes of a phrase form the beginning notes of the next phrase; Singing paradigm structures (chords, intervals, scales). A few respondents further mentioned that they combined exercises, for example, conducting the meter while sight singing.

From the results it could be clearly seen that although a wide spectrum of methods was indicated in all three countries (major trends: RSA 8-13 methods per lecturer, FRG 6-10 methods per lecturer, USA 4-12 methods per lecturer, ALL 6-10 methods per lecturer), the hypothesis *More emphasis is placed on Sight Singing and Dictation than on other teaching methods* was proved to be true. These two methods were furthermore also indicated by a very high percentage of the respondents. In the RSA, both Sight Singing and Dictation were indicated by all respondents, and in the

FRG, Dictation was indicated by 91.3% and Sight Singing by 87% of the respondents. In the USA, Sight Singing was indicated by 100% and Dictation by 98.1% of the respondents.[49]

According to the ranking order Table in which the indicated methods are ranked from the highest to the lowest percentages (Table 3.2), Dictation was ranked first and Sight singing second for all three countries calculated as a whole. There was, however, only a marginal difference of 0.4% between the first and second rankings. Verbal descriptions using Music Theory terminology and Error detection were ranked third and fourth in the overall response frequencies. From this Table it was also clear that drill and practice exercises overshadowed more creative approaches. Methods such as Graphic Representations, Improvisation, Verbal Descriptions using self-developed terminology, Aural Analysis, Imagination Tasks, as well as Conducting using free gestures, were indicated by very small minorities of the respondents (4.7% - 31.8%).

There was also reason to believe that Sight Singing and Dictation form the major part of aural instruction and that most time was devoted to the development of these skills. Examples from different entrance tests and final examination requirements presented in Appendix J confirmed this. Results from the *Institute for Music Theory Pedagogy II* show that the majority of respondents (84%) indicated 15 to more than 20 minutes scheduled for either melodic or harmonic dictation during a fifty-minute class. In the same survey, 88% of the participants indicated that they assessed Sight Singing progress through weekly assigned melodies tested individually in the class.[50] This activity could take up at least another 15 to 20 minutes. A simple calculation showed that 60 to 70 percent of the instruction time was thus taken up by Sight Singing and Dictation, leaving only 30 to 40 percent to develop other skills. As mentioned earlier, an average of 6-10 methods were applied per respondent. When Sight Singing and Dictation are subtracted from this total, seven methods remain to be included in the 30 to 40 percent of instruction time.

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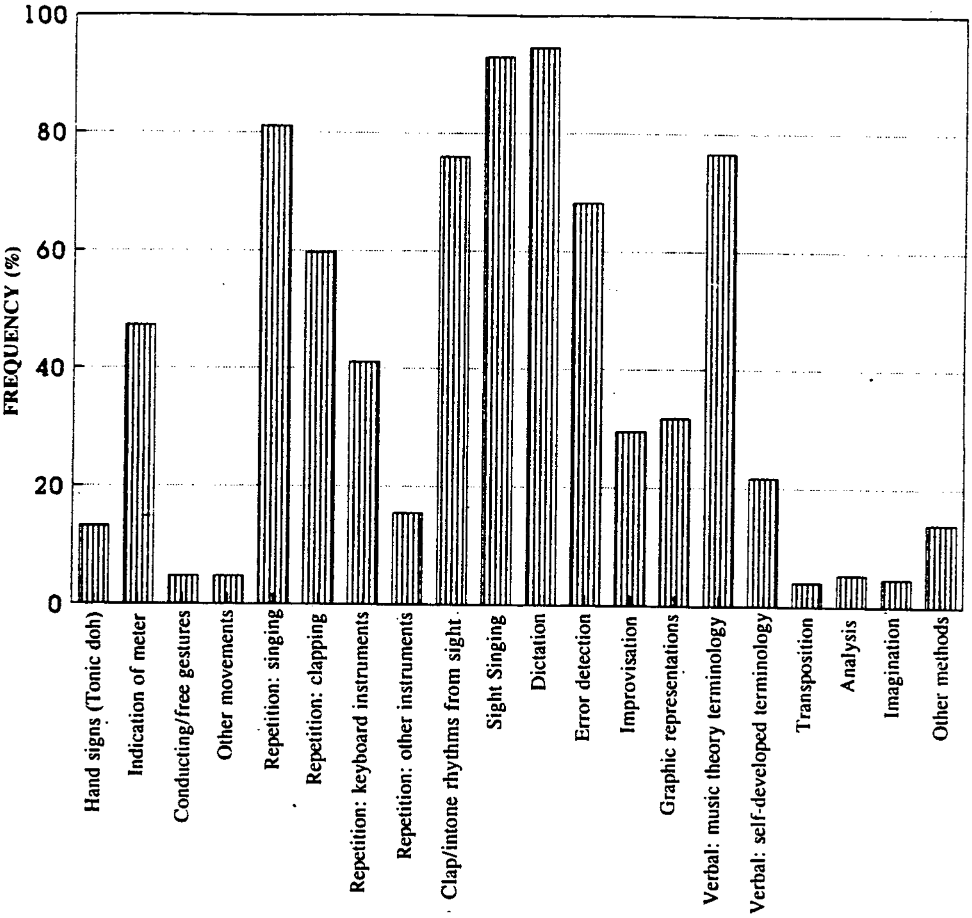
49 These results agree with the Pembrook-Riggins results which indicated that for freshmen, Sight Singing was mostly emphasised, with Dictation and Recognition/Identification in the second place. For sophomores, Dictation and Sight Singing were emphasised almost equally. Error Detection received the least amount of instructional time.
Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 237.

50 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 249-250.

Table 3.2 Ranking of the results of Question eleven

	RSA	FRG	USA	ALL
1	Dictation (100%) Sight Singing Repetition: singing Clap/intone rhythms from sight	Dictation (91.3%)	Sight Singing (100%)	Dictation (94.6%)
2	Error detection (85.7%) Verbal descriptions: Music theory terminology	Sight Singing (87%)	Dictation (98.1%)	Sight Singing (93%)
3	Indication of metre (71.4%) Repetition: clapping Repetition: keyboard instruments	Repetition: singing (84.1%)	Clap/intone rhythms from sight (77%)	Repetition: singing (81.1%)
4	Tonic doh hand signs (28.6%) Other movements Repetition: other instruments Improvisation Graphic representations Verbal descriptions: Self-developed terminology	Verbal descriptions: Music Theory terminology (79.7%)	Repetition: singing (75.5%)	Verbal descriptions: Music Theory terminology (76.6%) Clap/intone rhythms from sight
5	Transposition (14.3%) Aural analysis	Clap/intone rhythms from sight (72.5%)	Verbal descriptions: Music Theory terminology (69.8%)	Error detection (68.2%)
6		Repetition: clapping (68.1%)	Error detection (67.9%)	Repetition: clapping (59.7%)
7		Error detection (66.7%)	Indication of metre (60%)	Indication of metre (47.3%)
8		Repetition: keyboard instruments (52.2%)	Repetition: clapping (47.2%)	Repetition: keyboard instruments (41.1%)
9		Indication of metre (34.8%) Improvisation (34.8%)	Graphic representations (34%)	Graphic representations (31.8%)
10		Verbal descriptions: self-developed terminology (31.9%)	Repetition: keyboard instruments (22.6%) Improvisation	Improvisation (29.5%)
11		Graphic representations (30.4%)	Repetition: other instruments (13.2%)	Verbal descriptions: self-developed terminology (21.7%)
12		Repetition: other instruments (15.9%)	Tonic doh hand signs (9.4%)	Repetition: other instruments (15.5%)
13		Tonic doh hand signs (14.5%)	Verbal descriptions: self-developed terminology (7.5%)	Tonic doh hand signs (13.2%)
14		Imagination (8.7%)	Conducting (5.7%)	Transposition (4.1%)
15		Transposition (7.2%) Aural analysis	Other movements (3.8%)	Aural analysis (5.4%)
16		Conducting (4.3%)	Aural analysis (1.9%)	Imagination (4.7%) Conducting Other movements
17		Other movements (2.9%)		

Fig. 3.2 Aural Training methods used in all three countries (ALL)



As to the various methods used for the development of inner hearing, or as it was put in the questionnaire, 'the mental representation of pitch', results indicated that the Tonic doh method, singing on note names, as well as using neutral syllables such as *lah*, were all indicated by 71.4% of the RSA respondents, the majority of whom used 2-4 methods alongside one another. Singing on absolute note names was the most frequently used method in the FRG (78.3%), whereas the Tonic doh method was indicated by the majority of USA respondents (64.2%).[51] In both coun-

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51 The USA results were compared with results from the survey conducted at the *Institute for Music Theory Pedagogy II* and with the results from the Pembrook and Riggins survey:

	This research 1991	Institute Music Pedagogy	Pembrook and Riggins
Relative doh (Doh=tonic in maj. and lah=tonic in min.)	64.2%	44%	30%
Neutral syllables (e.g. "lah")	43.4%	*[1]	37%
Scale-degree numbers	34%	22%	49.5%
Absolute note names	30.2%	33%*	19%
Relative doh (Doh=tonic in both maj. and min.)	7.5%	*	35%
Fixed doh (no specification)	18.9%	8%	*
Fixed doh (doh=C, di=C sharp)	*	*	10%
Fixed doh (doh=C and C sharp)	*	*	6%
A combination	*	21%	*
Other	1.9%26%	3%	

[1] An asterisk indicates that the categories did not appear in the corresponding survey(s).

tries respondents used 1-2 methods alongside each other for the development of inner hearing.

> **Other methods included**: Nü-method by P. Koch (FRG), Jale system (FRG), Scat singing (FRG), Singing with the support of chords (FRG), Work by interval (USA), Chord symbols (USA), Kinetic/Keyboard, We use a modified moveable Doh in singing but do not *require* students to learn or use the syllables, though many do so (USA); Absolute note names - for alto and tenor clefs (USA).

The inevitable question arises as to the *best* method for developing mental pitch representation. Little research has been done as to the comparative values of pedagogical assets within each solmization system. Most of the research projects discussed in Chapter Two were conducted with children, and dealt with one or two methods only. Investigations on methods such as the use of numbers, absolute solmization and note names could not be found in the realm of tertiary instruction. Timothy A. Smith, however, indicated that, although he preferred the Tonic doh method, a practical pedagogy requires the discrete and systematic acquisition of skills which involves the use of other systems.[52] Markus Ulbrich also indicated that a flawless system did not exist. According to him the question should not be which method to use, but rather when to start and how often to practise this method.[53] No *best* method exists for solmization purposes, and at least two if not more different systems should be used in conjunction.

Although the formulation of this question left room for the inclusion of different ways of developing audiation skills, the given examples referred only to the use of solmization as a way of developing these skills. This had the effect that only solmization methods were indicated. Only six respondents mentioned the method of imagination and silent reading, trying to hear the music mentally. Even though Sight Singing was considered by many lecturers to be *the* method for developing the ability to look at a score and imagine the sounds, other methods such as Imagination, Improvisation and Score Reading can also develop this skill.[54]

The aspect of **structural hearing** was additionally covered by questions on Aural Analysis. According to the results, a moderate percentage of all respondents (68.2%) included Aural Analysis into their Aural Training programmes, concentrating mostly on music from the Baroque (93.2%), Classic (98.9%) and Romantic periods (91%). Twelve respondents who did not include Aural Analysis in their programmes completed this question, which could be an indication that music from these style periods formed the core material for all other methods. The fact that the Tonic

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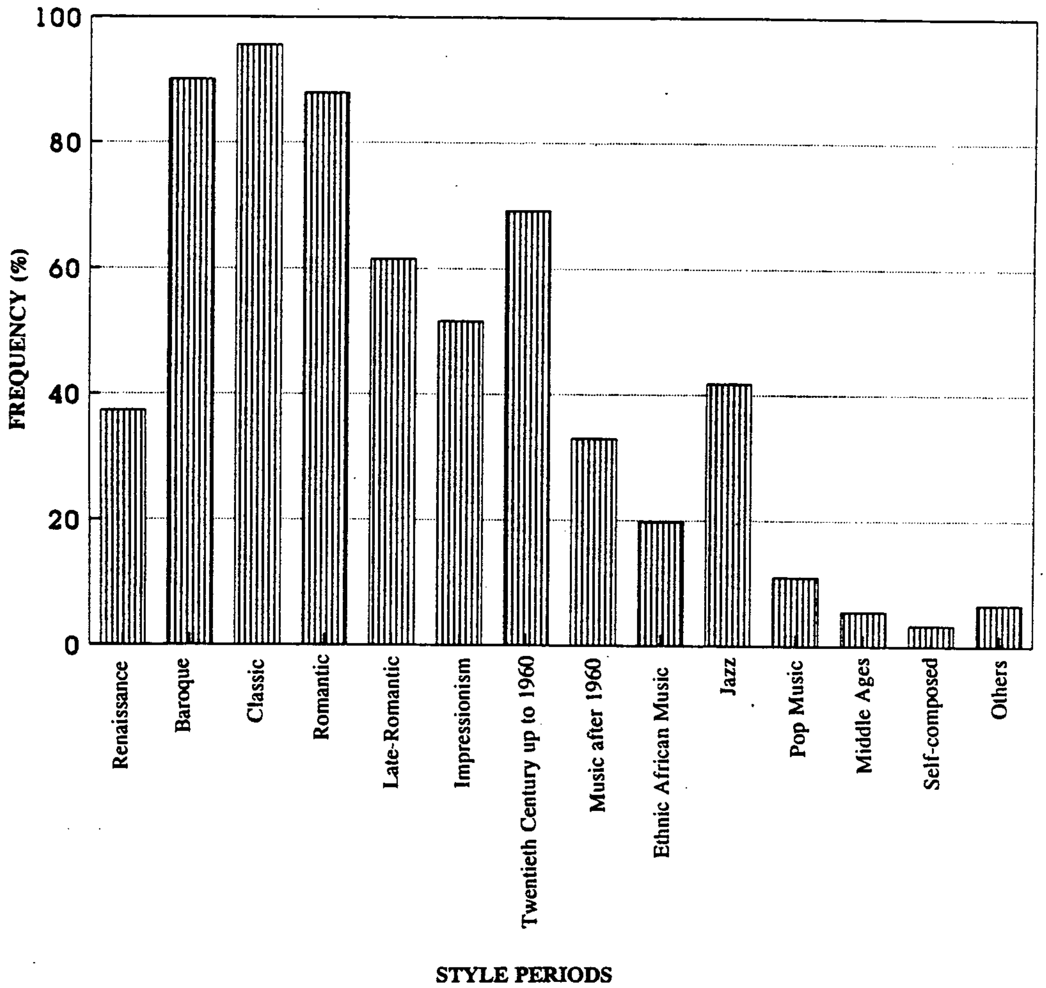
52 Timothy A. Smith, A "Comparison of Pedagogical Resources in Solmization Systems" in **Journal of Music Theory Pedagogy**, 5/1 (Spring 1991) pp. 21-22.

53 Professor Markus Ulbrich interviewed by the researcher on 10 May 1989.

54 According to Edwin Gordon, seven different types and six stages of audiation can be distinguished. Vocal or instrumental reading of music forms only one of these. He described reading as the audiation through notation of what is to be performed before it is performed.
Edwin E. Gordon, **Learning Sequences in Music: Skill, Content, and Patterns.** Chicago: G.I.A: 1989, p. 7.

doh method was indicated by the majority of USA respondents (64.2%) supports this suspicion that mostly tonal music is included in Aural Training curricula.[55]

Fig. 3.3 Style periods included in Aural Analysis: ALL three countries taken as a whole



It is, however, questionable whether the percentage of respondents indicating that they included Aural Analysis presented a true picture of the reality. According to observations by the researcher in the RSA and FRG this definitely is not the case. It could be that the formulation of this question was misleading. With the words *parts of it* in the English version of the questionnaire, a whole exposition or a developmental section of a sonata was, for

55 It is doubtful whether the RSA results, indicating that 60% of the respondents included music from the Twentieth century after 1960, are correct. According to this percentage, more respondents in the RSA included music composed by, for example, Karlheinz Stockhausen, György Ligeti, Helmut Lachenmann, Steve Reich, Brian Ferneyhough, Harrisson Birtwistle, to name just a few, than in the other two countries. Observations by the researcher, however, revealed that this is not the case. One reason for this outcome could be that the word "serious" was omitted in the category *Music after 1960*, which could have lead to the misunderstanding that popular music was meant. Another explanation could also be that the response rate of completed questionnaires was 54% for the RSA, and that sampling bias cannot be ruled out.

instance, meant. This distinction did not appear in the German translation. Two German advisors maintained that an explanatory example would have been unnecessary as the term *Aural Analysis* was considered to be a well-known expression amongst Aural Training lecturers in Germany. A detailed description of *Aural Analysis* was given in the Afrikaans translation of the questionnaire. The outcome could, however, be a result of sampling bias, as well as the fact that the English-speaking universities in the RSA received English questionnaires in which this detailed description did not appear.

Presumably, the majority of respondents understood merely microscopical analysis (the analysis of short phrases or periods) under the term *Aural Analysis*. The fact that a few respondents (3.4%) indicated they made use of self-composed material, as well as the comments below, strengthens this suspicion:

> I do include Aural Analysis but use only short excerpts where a modulation has to be determined or where a period consisting of eight measures should be recognised (FRG); the word "works" has been scratched out. Only parts (FRG); Better control if material is not from the literature (USA).

The results of the question on all possible methods provided a closer view of the truth. Aural Analysis of bigger form schemes was indicated by only 5.4% of all respondents, and was ranked fifteenth in the ranking order. A German respondent sketched the situation as follows:

> "Aural Analysis does not appear in normal Music Theory teaching and little attention is given to it in Aural Training. Aural Analysis requires a schooled ear, the use of analytical 'tools' as well as a basic music-historical orientation."[56]

With all this information at hand, it is now possible to conclude that the hypothesis *Aural Training is taught only in the smaller contexts of musical phrases and little attention is given to an overall structural approach* was considered to be true for all three countries.

Reasons for the negligence of Aural Analysis were as follows:

(a) I find that Aural Analysis is not easily put into practice. (RSA 0%, FRG 11.5%, USA 53.8%)
(b) Aural Analysis is an unknown field to me. (RSA 0%, FRG 19.2%, USA 23.1%)
(c) For advanced students (RSA 0%, FRG 11.5%, USA 23.1%)
(d) Part of other subjects such as History of Music Courses, Advanced Theory classes, "Contemporary Technique" classes, Form and Analysis classes. (RSA 50%, FRG 27%, USA 15.4%)
(e) Too little time available (RSA 50%, FRG 27%, USA 30.8%)
(f) Students too weak - overestimated (RSA 0%, FRG 11.5%, USA 0%)
(g) Waste of time/Unnecessary: We can analyse a short synoptic excerpt (e.g. eight measures) according to all parameters. (RSA 0%, FRG 7.7%, USA 0%)
(h) Other reasons
The gain in aural skills is too little, but is important for other music disciplines (FRG); Other skills are more important (ALL); Too many explanations are involved which take up precious teaching time (RSA); Our curriculum is so jammed with 'what-not' courses that we are forced to concentrate on essentials during the first three years. We do not have most of the music majors after that. (USA); I have not yet started with Aural Analysis (FRG); Aural Analysis in larger groups seems to be difficult (FRG); Aural Analysis is only possible in combination with the score (FRG).

56 Reseacher's translation: "...obwohl sie [die Höranalyse] im normalen Musiktheorieunterricht gar nicht vorkommt. Gehörbildung wird sehr wohl betrieben, zur Höranalyse (die jedoch ein geschultes Gehör und ein analytisches Instrumentarium plus eine musikhistorische Grundorientierung voraussetzt (meine Meinung) kommt man dagegen kaum."

Cross-tabulation calculations between *General instruction time sufficient* and *Too little time available for Aural Analysis* were examined in order to determine the importance of Aural Analysis. If a strong relationship exists between these two aspects, it can be concluded that Aural Analysis was not considered to be important. Only four respondents indicated both the above sufficiency/insufficiency, and it is possible that respondents would have liked to include Aural Analysis if they had more time available. It was, however, clear that analysis of broader excerpts or whole works were not considered to be important enough to take some time away from teaching Sight Singing and Dictation skills.

Five possible reasons for this tendency to focus on drill exercises are:

- Drill exercises provide the teacher with means to evaluate what the mind is "hearing".
- Drill exercises are readily quantifiable.
- Less preparation needs to be done by the lecturer for Sight Singing and Dictation classes, than to prepare more creative classes.
- The available instruction time is barely sufficient to prepare students for the final examination which requires mainly the mastering of Sight Singing and Dictational skills.
- Aural Training lecturers do not consider other more creative skills to be important.

According to Rogers, there is a natural tendency to emphasise those aspects of musical experience that are the most "teachable" and "testable". Theory teachers often tend to over-emphasise topics or questions that permit clear-cut right or wrong answers, while avoiding "treacherous" areas of ambiguity.[57] Although referring to the general British Music Education situation, Keith Swanwick's description of teachers operating in a 'pick and mix' curriculum trying to select from the things that seem to 'work', is also appropriate to describe Aural Training instruction. He also pointed out that formulating behavioural objectives trivialises the activity. Focus is placed on those things that can be easily observed, distracting the attention of teachers from more important but less obvious outcomes. Important things such as sensitivity and appreciation are neglected.[58]

The reason for the phenomenon of concentrating on drill and practice is also connected to a psychological problem. Due to the "black box syndrome" (the fact that nobody, neither the teacher nor the student, is able to look into the mind in order to accurately measure the *exact* amount of cognition that took place), the outer conduct of the student provides the only way of observing aural understanding. Influenced by the Behaviourist school of thinking, there is a tendency amongst teachers to believe that listening behaviour cannot be improved until the right external conditions are found, and that proper behaviour is reinforced by repetition and drill until the correct response is constantly given. The primary attention is focused on the method and not on listening or on music.[59]

In this respect, Dictation and Sight Singing as well as other drill exercises provide ways of demonstrating some aspects of the state of the trained mind. There is nothing wrong with the desire to be able to trace the development of

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57 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 p. 5.

58 Keith Swanwick, **Music, Mind, and Education.** London: Routledge, 1988 pp. 17 and 125.

59 Emily Ruth Brink, **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 13-17.

the student. This desire, however, becomes an obstacle when attached to the theory that high marks imply full cognition. This often observed juxtaposition of aural comprehension and grades inevitably leads to the next reason.

In order to quantify drill exercises, the teacher can easily calculate percentage scales, count errors precisely and provide the student with an exact numerical score for his performance. This could, for example, be seen in the detailed system of quantification used at the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart.*[60] David Lee Graves went so far as to develop a "reliable and objective diagnostic measurement of Sight Singing achievement for students in lower division music major programmes", as well as a "practical electronic means of accurately measuring pitch in vocal performance." Scores for correct intervals, pitches and items as well as a composite score were provided. He concluded that his test might serve as a model in fulfilling needs for (a) an objective evaluative tool in Sight Singing, (b) diagnostic information for Sight Singing instructors, (c) comparative and predictive data, and (d) placement testing in college music theory programmes.[61]

Comments from various respondents revealed that Aural Training instruction was often based on examination requirements, which basically consisted of easily measured skills. Richard Ashley warned against this phenomenon:

> "... we must resist the temptation to use criteria which are too facilely quantifiable - even if these criteria offer a measure of self-comfort to the teacher in some tough decision. ...The efficiency of the classroom procedure is no doubt important, but should not be allowed to be the sole determinant. Efficiency as a world-view may not be the way to produce musicians."[62]

Apart from the fact that certain methods of Aural Training can be more readily quantified than others, drill and practice could also imply less preparation time. Examples for Dictation and Sight Singing purposes can be taken from a good textbook/workbook, and this material can fill 60 to 70 percent of the instruction time. Bernd Enders captured the nature of Aural Training classes with his question on what the costs involved were when a lecturer played a perfect fifth (or for that matter a phrase to dictate) during an Aural Training class![63]

It is and will always be a problem to combine creativity and quantification in such a way that will satisfy the majority of musicians. Students will always need grade certificates with their musical competence mathematically expressed in order to apply for jobs. Skills that can be easily quantified do have a place in the Aural Training class, BUT care should be taken that these skills do not reduce Aural Training to mainly drill exercises merely to help the student pass his aural examination. Such an approach does not leave room for creativity and/or for experimental approaches. One cannot help but wonder if this attitude is not partially responsible for the lack of interest of many students in Aural Training.

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60 An example of *Die Abschlußprüfung in Gehörbildung* of the *Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart* (1985) is included in Appendix G.

61 David Lee Graves, "The Development of an Objective Sight Singing Achievement Test employing Electronic Measurement Apparatus" in **Dissertation Abstracts International**, 41/10 (April 1981) p. 4322-A.

62 Richard Douglas Ashley, **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1980 p. 22.

63 Hans-Jörg Rüdiger, "Schott Computerkolleg Musik Gehörbildungs-software für Atari ST" in **Keyboards - Homerecording & Computer**, March 1991 p. 144.

> "Channeling of the thought process into black-and-white categories is important at a beginning stage so that basic concepts can be established, but eventually a theory program must move ahead to create tolerance and enthusiasm for the discovery, exploration, and comparison of a wide range of *differing* musical ideas and must promote the ability to back up decisions and judgments with logic, consistency, and imagination."[64]

Finally, Timothy A. Smith pointed out that there are lecturers within every music department that would be content with an Aural Training strategy that aims only to produce fluent readers. The purpose of Aural Training from a theorist's point of view, however, is broader, namely "to produce musicians who can perceive, understand, and analyse music with utmost intelligence and skill."[65]

3.4 Teaching materials and attitudes towards research

Teaching materials regarding the use of textbooks/workbooks, the nature of music examples, respondents' opinions about published subject-related articles, workshops and study groups, as well as respondents' attitudes towards research in the field of Aural Training were examined.

An average of 76.7% of all respondents included **textbooks/workbooks** in their instruction programmes. Although a majority of FRG respondents (68.1%) indicated the use of books, this percentage was considerably lower than in the RSA (100%) and USA (84.9%). A reason for this could be that 58% of the FRG respondents furthermore indicated that they mainly used examples from the music repertoire along with a few self-composed exercises, whereas 47.2% of the USA respondents indicated the use of self-composed exercises along with a few examples from the music repertoire.[66] In the RSA 71.4% indicated the use of examples from the music repertoire along with a few self-composed exercises. The overall response frequency of 50.4% implied that the controversy on *self-composed* or *material from the music literature* was still continuing. However, there seemed to be a shift towards the latter as opposed to the 37.2% of the respondents who indicated that they used mainly self-composed material.

A complete list of all text- and workbooks indicated by the respondents appears in Appendix G. The books by Roland Mackamul were used by the majority of RSA (42.9%) and FRG (65.6%) respondents. In the USA the books by Bruce Benward, (22.2%) Berkowitz et al. (26.7%) and Robert Ottman (22.2) were most frequently used.[67] The

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64 Michael R. Rogers, **Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies.** Edwardsville: Southern Illinois University Press, 1984 p. 5.

65 Timothy A. Smith, A "Comparison of Pedagogical Resources in Solmization Systems" in **Journal of Music Theory Pedagogy**, 5/1 (Spring 1991) p. 2.

66 A similar question was asked at the *Institute for Music Theory Pedagogy Studies II*, with the results indicating that the materials used for sight singing were (a) in a text (91%); (b) written by the lecturer (44%) and (c) examples from the literature (52%).
Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 251.

67 These results agree with the results of Collins and Killam. Pembrook and Riggins found that *Ear Training: A Technique for Listening and Sight Singing Complete* by Benward was indicated by the majority of respondents in the USA.
Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 231 and 237.

influence of both German and American literature on South African music education was reflected in the use of the Berkowitz and Mackamul texts in the RSA.[68] Only *Modus Novus* by Lars Edlund was indicated by respondents from all three countries. There is a need for more international contact between different Aural Training departments.

With regard to respondents' **attitudes towards publications, study groups and current research endeavours**, the majority indicated that:

(a) More articles should be published on the didactics of Aural Training (RSA 85.7%, FRG 53.6%, USA 67.9%).
(b) More study groups and workshops on the didactics of Aural Training were needed (RSA 71.4%, FRG 55.1%, USA 77.4%).
(c) More research should be done in the field of Aural Training (RSA 85.7%, FRG 62.3%, USA 79.2%).

Some respondents recommended that more research should be done in the field of computer-student interaction. One respondent stated that there were enough articles, though often of low quality. The need for more "realistic" (practice-orientated) research and investigations into the methodology of Music Theory was also expressed. According to one German respondent, a number of methods were based on the application of incorrect historical facts. Some respondents also indicated that they did not have study groups and/or professional contact in the field of Aural Training.

It was conspicuous that 24.6% of the FRG respondents did not answer this question. A reason for this could be that the respondents were not well informed as to publications and articles on Aural Training. Little research has also been done in the FRG on this topic, a fact which indirectly is linked to the German system of dividing practical and theoretical music subjects into two different fields of study, namely Musicology and Practical Music studies. Musicology consists mainly of historical, analytical and music psychological studies and is presented at universities. All the so-called practical subjects (Performance, Music Theory, Aural Training, Conducting, Composition, etc.) and selected theoretical aspects of, for example, Music History, form part of music courses presented at *Musikhochschulen*. As a result of this very little, if any, research has been done on practical subjects. Apart from music psychological research on perception and perfect pitch, and the role that aural perception should play in general school music education, only three German dissertations could be found on Aural Training in the

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68 Bruce Benward, **Workbook in Advanced Ear Training - Teachers Dictation Manual.** Dubuque, Iowa: Wm.C. Brown, 1961.
Workbook in Advanced Ear Training. Dubuque, Iowa: Wm.C. Brown, 1961.
Sightsinging Complete. Dubuque, Iowa: Wm.C. Brown, 1973.
Ear Training: A Technique for Listening. Dubuque: Wm.C. Brown, 1978.
Elementary Ear Training. Dubuque, Iowa: Wm.C. Brown, 1983.
Sol Berkowitz, Gabriel Fontrier and Leo Kraft: **A New Approach to Sight Singing.** New York: W.W. Norton, 1976, Revised edition. (Third edition 1986 also available.)
Lars Edlund, **Modus Novus - Studies in Reading Atonal Melodies.** London: J. and W. Chester, [Foreword 1963].
Roland Mackamul, **Lehrbuch der Gehörbildung, Bänder 1 und 2.** Kassel. Bärenreiter, 1969.
Robert W. Ottman, **Music for Sight Singing.** Englewood Cliffs, N.J.: Prentice-Hall, 1956 [1st], 1967 [2nd], 1986 [3rd] editions.
More Music for Sight Singing. Englewood Cliffs, N.J.: Prentice-Hall, 1981.

Jahresverzeichnis der deutschen Hochschulschriften 1936-1992.[69] These dissertations cannot be borrowed through inter-library services, which means that Aural Training lecturers or other interested parties do not have access to them. This situation differs from that in both the other two countries where an increasing interest amongst researchers to examine aspects of Aural Training could be clearly seen in the list of investigations presented in Appendix A.

It is a positive sign that the majority of all respondents (70.5%) recommended more research on Aural Training didactics, but it is also debatable whether these research results will significantly influence teaching practices. As was already explained in Chapter Two, since the beginning of the 1980s, research results and articles have been underlining the importance of structural hearing. Aural Training courses were criticised for dealing only with phrase-length patterns, excluding longer musical entities. Aural work is often started on a detailed level without considering broader aspects of the passage in question. Applications of the *Gestalt* theory to music emphasised the fact that patterns, forms or configurations are perceived, organising sensory stimulation into meaningful wholes.

> "We must avoid a reductionist attitude, imagining that we build up musical experience from rudimentary atoms: that, for example, we first perceive intervals or single tones and that musical lines or textures are assembled in our minds only after analysis of the component parts has taken place. The converse is surely true. Analytic description is a different perceptual and conceptual mode which may have some value, but may also divert us from phrase, from expressive gesture, from the play of musical structure, from the coherence and sweep of musical passages."[70]

Since Gary E. Wittlich and Lee Humphries published their Aural Training text based on structural thinking in 1974 no other text which took the above research results into account has been published.[71] The Wittlich-Humphries text was never even indicated in the questionnaire and books concentrating on isolated aspects or short phrases formed the core of instruction material. Instead, books published in the late 1980s and early 1990s still concentrated on fragmented approaches.[72] Holistic approaches do not appear in textbooks, which consist merely of self-composed exercises. One respondent highlighted the fact that no books on Aural Analysis exist in the German language.

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69 The dissertations are: Wolfram Heiking, **Die Entwicklung von Klangvorstellungen im Fach *Musiktheorie mit Gehörbildung*.** Doctoral dissertation, Pedagogical College Potsdam 1959.
Adolf Volny, **Untersuchungen zur Ermittlung einer höheren Effektivität im Gehörbildungsunterricht durch Anwendung und Erprobung methodisch aufbereiteter Arbeitsmaterialien und tontechnischer Abhörvorrichtungen.** Doctoral dissertation A, Von Humbolt University Berlin, 1975.
Adolf Volny, **Analytische Untersuchungen melodischer Merkmale und Strukturen in ihren elementaren Bewegungsverläufen: ein theoretischer Beitrag zum rationalen Erfassen und bewußten Identifizieren tonal-melodischen Abläufe im Gehörbildungsunterricht.** Doctoral dissertation B, Von Humbolt University Berlin, 1978.

70 Keith Swanwick, **Music, Mind, and Education.** London: Routledge, 1988 p. 24.

71 Gary E. Wittlich and Lee Humphries, **Ear Training - An Approach through Music Literature.** New York: Harcourt Brace Jovanovich, 1974.

72 Samuel Adler, **Sight Singing.** New York: W.W. Norton, 1979.
Wolfgang Breuer, **Gehörbildung - Für Unterricht und Selbstunterricht.** Stuttgart: J.B. Metzler, 1990.
Michael L. Friedmann, **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990.
Heinz-Christian Schaper, **Gehörbildung compact - Teil I: Grundlagen und Übungen.** Mainz: Schott, 1989.

In the previous section on the methodological approaches of Aural Training, it was clear that drill and practice reigned over structural approaches such as Aural Analysis of whole compositions, improvisation and composition. Only 5.4% of the respondents included an overall structural approach in their Aural Training. It can therefore be concluded that valuable research by, for example, Emily Ruth Brink and others has had a minor influence, if any, on the teaching of Aural Training.

Reasons for this phenomenon could be that (a) due to either ignorance or busy schedules, lecturers did not spend much time keeping up with the latest research results, and (b) much time was organizationally needed to change syllabi in order to incorporate new ideas.

3.5 Non-Computer-assisted Aural Training (NCAT)

Two questions were asked on the inclusion of NCAT in Aural Training. The majority of the 55.8% of all respondents indicated that they used some form of NCAT. Whereas the use of commercially available programmes was indicated by the majority of RSA respondents (60%), the tendency to make use of self-developed exercises on cassettes was observed in the comments of the respondents from the other two countries.[73] Because dictation exercises could be easily adapted for programmed instruction, the majority of all respondents (79.5%) indicated this. The use of multiple-choice answer sheets in combination with cassettes was indicated by 9% of all respondents, and completion tasks (parts of the score is left out and the student has to fill in the missing information according to the assignment and what was heard) was furthermore indicated by 23%, of which the majority of respondents came from the FRG (34.9%).

The question as to other programmes provided many diverse answers in which certain trends could be recognised. Although response frequencies were calculated for these answers, they were practically non-essential, because detailed descriptions of the programmes were not requested. For example, it was most probably the case that all respondents used NCAT for homework purposes, although only 15.4% indicated this. The diversity of programmes and methods described is of much more value than the frequency percentages.

General trends that crystallised from the answers were that cassettes were also used for: *aural analysis* (students have to listen to a composition and comment on it with or without the help of questions to guide the listening process), *"playing by ear"* (repetition of what was heard on their own or other instruments), *transcription* (from recordings), *timbre recognition*, drill in *"building block" exercises* (intervals, triads, etc.), *examples of the entrance test and final*

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73 An excellent example of a systematic cassette-based Aural Training programme, the **Freiburger Hörprogramme**, was developed by Markus Ulbrich at the *Staatliche Hochschule für Musik Freiburg/Breisgau* in 1983. The programme consists of eleven parts and concentrates mainly on rhythmic, melodic, one-to-more-part dictation taken from the music literature and played on 28 different instruments. Examples of the entrance test and final examinations are also included. Two of the eleven parts make use of prepared multiple-choice answer sheets for questions on isolated intervals, scales, triads and cadences.

An example of self-developed programmes in the USA was described as follows: "My Self Help Aural Recognition Program (SHARP) - each cassette with 100 examples of intervals or chords, with an accompanying book with which students may check their answers or give themselves practise quizzes."

examinations, *comparisons of different interpretations of the same work*, *error detection* and *chord analysis* (tonic, dominant, subdominant, secondary dominants, Neapolitan and augmented sixth chords).

Several respondents additionally indicated that they used examples from the music literature and gave descriptions of methods that they used that do not really fall into the category of programmed instruction, but were nevertheless very interesting. Example of such cases are:

> Each student has to create a short score and has to rehearse that with the group in order to develop inner hearing, creativity, pedagogical skills and error detection (FRG); Students work on their own and hand in weekly assignments for assessment. No limit is placed on amount of work to be handed in and students can work at their own pace. A realistic minimum requirement is set as DP (Duly Performed) (RSA).

Cross-tabulation calculations showed that 79.1% of all respondents (RSA 71.4%, FRG 72.3%. USA 88.7%) provided their students with some form of outside class instruction either in the form of NCAT, CAT and/or teaching assistants. Both forms of programmed instruction were omitted by 27.1% of all respondents, of which only 10.9% had teaching assistants to help weaker students.

It can be concluded that the majority of respondents from all three countries included NCAT, CAT and or teaching assistants in the curricula. The contents of NCAT consisted mainly of isolated drill exercises such as interval recognition and dictation for homework purposes, and only a few respondents indicated that they used cassettes for more comprehensive approaches such as aural analysis and comparisons of different interpretations of the same work.

3.6 Computer-assisted Aural Training (CAT)

Depending on whether respondents included CAT in their Aural Training programmes or not, a branching of questions took place in order to find reasons for the omission of CAT. Further aspects such as CAT users amongst students, the hardware and software used, self-developed software, the efficiency of CAT, and all respondents' interests and ultimate software wishes were examined.

Concerning the inclusion of CAT in Aural Training programmes, diverse results were obtained from the three countries. In the RSA (57.1%) and USA (73.6%) the majority of respondents included this form of programmed instruction, whereas 89.8% of the FRG respondents did not make use of CAT.

The majority of all respondents (RSA 75%, FRG 71.4%, USA 66.6%) indicated that the computer was used for homework purposes only.[74] In the FRG (14.3%) and USA (33.3%) respondents indicated that CAT formed part of both teaching and practice. All students in the RSA (75%) and USA (92.3%), and only under performing students in

[74] Only 4% of the lecturers in the USA used computers as a substitute for classroom-based instruction. Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) p. 238.

the FRG (42.9%) made use of CAT. One USA respondent mentioned that a small incentive (60 of 1000 total grade points in a term) were given to students for using the computers or the pre-recorded tapes for practice.[75]

The hypothesis *Computer-assisted instruction is not included in the majority of Aural Training curricula* was thus proved to be true for the FRG, but had to be rejected for the RSA and USA.

Reasons for excluding CAT from Aural Training curricula were:

(a) I do not know enough about existing Aural Training software. (RSA 33.3%, FRG 33.9%, USA 35.7%)
(b) I find the synthesized sounds unnatural and not aesthetic. (RSA 0%, FRG 40.3 %, USA 14.3%)
(c) Single elements such as intervals and chords are practised outside of a musical context. (FRG 19.4%, RSA and USA 0%)
(d) Computer programs are too limited. (RSA 33.3%, FRG 21%, USA 14.3%)
(e) The technical environment, e.g. the right cable connections, combinations of switches, etc. causes inconvenience. (RSA 0%, FRG 29%, USA 14.3%)
(f) Programs are not user-friendly. (RSA 0%, FRG 1.6%, USA 7.1%)
(g) The financial commitment is too big. (RSA 100%, FRG 19.4%, USA 35.7%)
(h) There is no computer available at our music department for Aural Training purposes. (RSA 0%, FRG 19.4%, USA 7.1%)
(i) We are in a transitional phase: it is planned for the future. (RSA 0%, FRG 6.5%, USA 28.6%)
(j) CAT is unnecessary. (RSA 33.3%, FRG 6.5%, USA 7.1%)
(k) Computers are inhuman. (RSA 0%, FRG 6.5% USA 7.1%)
(l) CAT is a possibility for homework purposes. (RSA 0%, FRG 6.5%, USA 7.1%)
(m) Other (RSA 66.7%, FRG 35.5%, USA 57.1%)

Lack of adequate rooms (space) (FRG and USA); Lack of time to thoroughly examine the possibilities of CAT; (FRG); I prefer "live" music (FRG); CAT can be helpful in preparatory instruction but it is not creative enough on a tertiary level (FRG); Weak students benefit more from classroom-based instruction with the use of the piano; (FRG); The use of the piano in classroom-based instruction enables a more flexible methodological approach in comparison to CAT (FRG); I love the sound of the piano and the feel of the keys under my fingers (FRG); The instruments at hand in classroom-based instruction are more comprehensive and lively if they can be used according to the actual teaching situation (FRG); I believe that Aural Training takes places in that the student has to react by means of producing sound. If the computer cannot interpret this sound and evaluate it, it does not have the possibility to meet the student's basic needs (RSA); The imitation of timbre is insufficient. Sine waves are not equal to "natural tone imitation". "Natural" = the sum of sine waves. The ear was not designed for sine wave "sound happenings" (Schallereignisse) (FRG); Pitch is misleading - prefer acoustic sounds (USA); I don't think a program of sufficient sophistication and authentic sound exists (USA); Group education with CAT seems to be problematic (FRG and USA); Related to the contractual obligations and contractual arrangement of my job (USA); A computer program is limited by the knowledge/philosophy of the programmer. Therefore it is important to examine the didactics of Music Theory in order to prevent the misleading of students to listen falsely according to so-called historical rules that are not valid. (FRG); The few advantages of CAT do not weigh up against the financial burden and organisation attached to it (RSA).

The question on the features of a computer program that would meet the respondent's expectations provided a very wide spectrum of answers, ranging from five German respondents (7.9%) indicating that they were not at all interested in CAT, to respondents expressing their openness to any possibility of gaining aural skills.

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75 According to the *Institute for Music Theory Pedagogy Studies II* survey, 57% of their respondents required computer assignments along with their music theory curriculum. These assignments were monitored by: an instructor checking individuals (28%), occasionally in class (26%), through a teaching assistant (18%), through a tutor (4%), other (24%0).
Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 247.

Programs where the teacher can include his/her own examples from the music literature were favoured by 60.5% of all respondents. Another 57.4% of all respondents chose (a) programs to check sight singing with regard to interval, intonation and rhythmic mistakes; (b) the possibility to project a score on the monitor with the help of a computer reading apparatus in order to select and sound one voice, instrumental group, e.g. the first violins, etc.; (c) programs with examples from the music literature (score appears on the monitor) in which any chosen sounding or written voice(s) can be left out. This provides the possibility to do sight singing and improvisation within a musical context.

Programs which include questions on the character, style, form, harmonic content, etc. of short excerpts of works were indicated by 50.4% of all respondents. The same percentage of respondents indicated that they would also be interested in the possibility of manipulating music on records/CDs for Aural Training purposes (Hyper-Media). The use of perfect sound imitations of acoustical instruments in synthesizers was indicated by 41.9% of all respondents.

Other wishes were: Programs in which problem areas are diagnosed and the next step of practice/learning is recommended (RSA and FRG); Error detection programs which prepare students for their careers: While following the score and listening to the piece being performed, the student should indicate which orchestra player made rhythmic mistakes, played wrong notes, or had intonation problems. (FRG); Treatment of intonation problems in both natural and equal-tempered tuning systems (FRG); Improved computer programs. Some devoted to correct chord progressions in tonal music; Drill! (USA); Programs which test the "building blocks" such as triads, chords and resolutions, scales, modes etc. so that more time can be spent on more musical aspects (USA); Software for NeXT computers (USA); Beyond my expectations but sounds great! (USA); Programs enabling students to explore musical contexts by modifying given examples, rescoring for different timbres, renovating, etc. Multi-media computer environments (USA); Discovery learning (creating musical objects and assembling them to reproduce an excerpt) (USA); Generally, the more tutorial (instead of merely a countability) the better (USA); All of these things seem technically possible either now or soon. Whether they are pedagogically desirable is another question. I don't see much value in, for example, your (f) possibility, when I can give a student a score, play the requisite line on the piano, and then play the whole recorded example. Putting a computer into the process doesn't change the pedagogical situation there (USA); Most of these capabilities are now available to me (USA); None are utopian - we do them all (USA); The possibility for singers to do Sight singing with orchestra accompaniment (FRG); My (not at all utopian goal) is to have programs which allows for flexible input of answers combined with simple usage instructions (user-friendliness) (FRG); The existence of exercise libraries that can be expanded by the teacher (FRG); Programs in which the timbre, rhythm, melody, harmony and form can be influenced (FRG); The translation of sound into music notation (FRG); The manipulation of the sound spectrum (sound analysis and synthesis) and the spatial disposition of sounds and parts of the musical score (FRG); The computer indicates errors in dictation (RSA); Possibilities for Graphic Audiovisuals - Animated screens - music is motion, therefore the visuals should move - including light-intensities and various forms of graphic scores - to be used to highlight one or other parameter/facet of the music (RSA); I would be open to any possibility of gaining aural skills (RSA and FRG).

Cross-tabulation calculations between program features and respondents who did include CAT and those who did not include CAT revealed that there was, with the exception of the RSA respondents, a general tendency amongst CAT respondents to indicate higher percentages of program wishes (differences of 6.8% - 27.2% between CAT and No CAT respondents). It was very obvious that 19.4% of the No CAT FRG respondents did not answer this question. This most probably was due to a total lack of interest in CAT, a fact that was also seen in the 89.8% of FRG respondents who did not make use of computer-assisted instruction. There was also a tendency for the FRG response frequencies of ultimate computer program features to be slightly lower than those in the other two countries. Reasons for this could be that only five Aural Training computer programs have been available in the German language since the late 1980s. Furthermore, respondents were not very well-informed about the existence, the advantages and the disadvantages of CAT. Respondents from all three countries (RSA 85.7%, FRG 62.3%, USA 64.2%) nevertheless indicated that they would be interested in a workshop concerning the use of CAT.

Regarding the hardware used, the majority of the RSA respondents indicated the use of IBM/IBM compatible computers (75%). In the FRG 100% indicated the use of the Atari computer, while 64.1% of the USA respondents used Macintosh computers and 51.3% different Apple models. Only 28.2% of the USA respondents indicated that they used no additional hardware for sound generation. The use of sound cards was indicated by the majority of RSA respondents (74%), whereas synthesizers and sample players were indicated by the majority of respondents in the FRG (71.4%) and USA (61.5%). Twelve percent of all respondents indicated the use of samplers and 14% the use of Yamaha Clavinovas (electronic pianos).

A question on the choice of CAT software indicated that *Guido* was used by all the RSA respondents. Only one RSA respondent included *Practica Musica*. German-developed programs (*Audimax* 71.4%, *Computerkolleg*, *Aura*, and sequencer programs (57.1%)) were indicated by the FRG respondents. In the USA self-programmed software (46.2%) and software published by *Temporal Acuity Products* (35.9%), *Practica Musica* (28.2%) and *McGamut* (25.6%) were indicated by the majority of the respondents (35.9%). Other software used in the USA was: Software to accompany the Bruce Benward text *Ear-Training: A Technique for Listening*, *McGamut*, *Guido*, *Perceive*, *Micro^Notes Music Theory* and *CAMUS*. The use of sequencer programs was mentioned by several respondents[76], and a few USA respondents additionally indicated that they used more than one program in their computer laboratory. Only one USA respondent indicated the use of CD-ROM programs. No self-developed computer software was indicated in the RSA.

Such a wide variety of reasons for the the specific choices of software were given that a statistical interpretation of the results was meaningless. A few respondents indicated characteristics such as completeness and flexibility, satisfying contents, student interaction and scoring features, efficiency, graduated order of difficulty, broad spectrum of training and the fact that it provided for the local needs, usability, both versatile and user-friendly. The majority of other comments revealed that the specific program was known, the only one available at the time/for the Apple/Atari/Macintosh, the best amongst those available, was available/developed at their school, and "least worst".

Although it may be a practical solution, the availability of a program should never be the ultimate reason for choosing it. The last comment "least worst" summarised the state of CAT as being in need of a re-examination of the existing Aural Training software which concentrates on practice and drill only. This demand for revision was also evident in the fact that the majority of all the respondents who developed self-programmed software (55%) were dissatisfied with the commercially available software, and 45% indicated that their programs had other features such as, for example, the ability to use any CD, the use of real music examples, direct microphone input to a pitch extractor which enables the conversion of input into notation, real-time harmonization, improvisation, playing-by-ear, harmonic dictation exercises in which different voices (SATB) can be emphasised with each playing. There was a

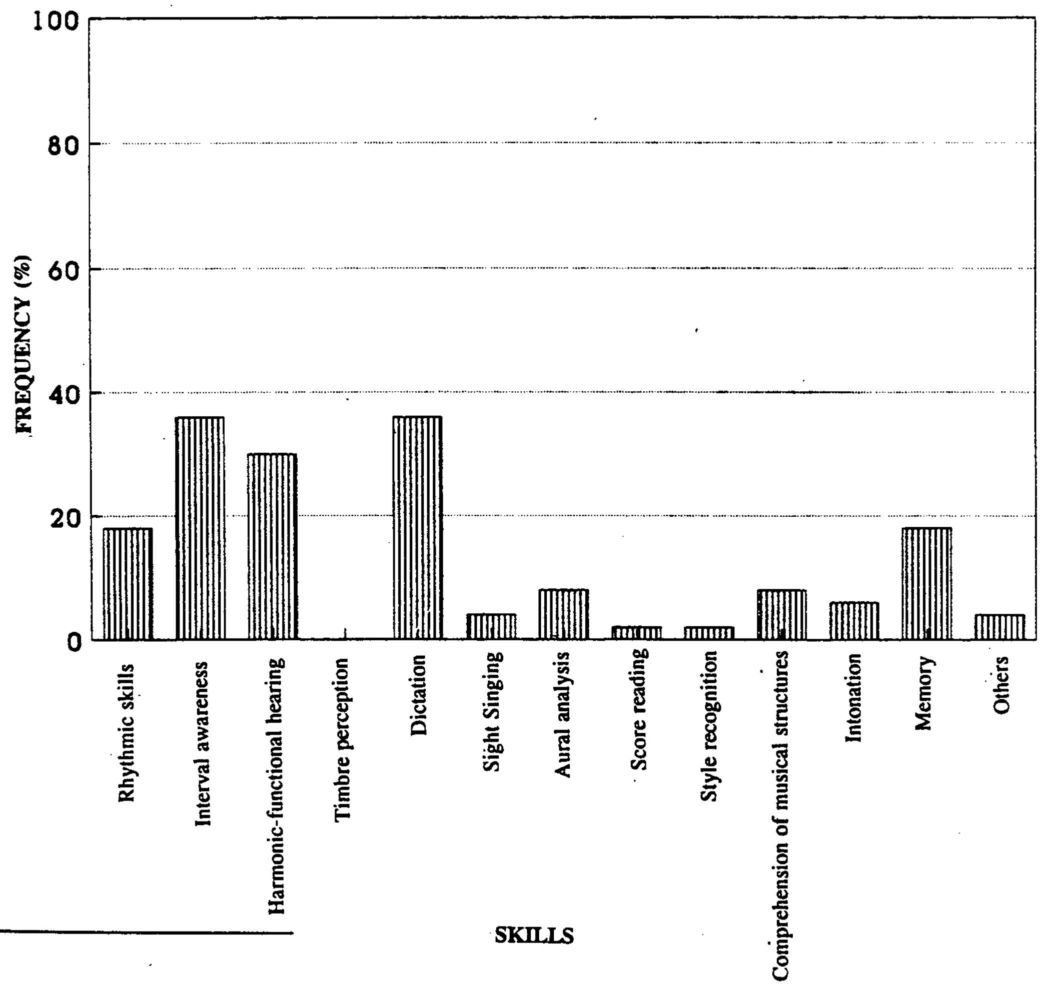
76 "Sequencers are to the digital music world what tape decks are to the analog music world. Like tape decks, sequencers record and store music data, allowing the musician to edit that music, record multiple tracks, listen to and play that same music, and modify it to his or her particular liking." Harvey P. Newquist, **Music & Technology**. New York: Billboard Books, 1989 p. 129.

strong correlation between these newer program trends and most of the earlier discussed "wish" programs that emphasised more creative, holistic and practice-orientated approaches to Aural Training.[77]

Whereas 75% of the RSA respondents indicated that the achievements of their students improved noticeably since they started to use CAT, only 43.6% of the USA respondents indicated this, with 20.5% indicating a definite "no". The hypothesis *In cases where Computer-assisted Aural Training has been applied, the achievements of students have improved noticeably* was proved to be true for the majority of the RSA and USA respondents. It is, however, important to note that 35.9% of the USA respondents indicated that they had not been using the computer for a long enough period to answer this question. This was also indicated by 85.7% of the FRG respondents.

From the graph presented in Fig. 3.4 it can be clearly seen that mostly drill exercises benefited the most by computer treatment. The improvement of interval awareness and dictation was indicated by 85.7%, and harmonic-functional hearing by 71.4% of all respondents. It was also very obvious that the more creative and comprehensive exercises, such as Aural Analysis and the comprehension of musical structures, were indicated by low percentages of respondents. The development of timbre perception was not indicated by any respondent. It can be concluded that software in its current state has a limited scope for improving skills. Most emphasis is placed on a fragmented approach of drill in isolated parameters.

Fig. 3.4 Efficiency of CAT in all three countries: Improved skills



77 Only one of the nine respondents who were willing to make their software available for research purposes actually responded by mailing software to the researcher. The contents of the programs described above could thus not be surveyed.

3.7 Other aspects of Aural Training

The final question dealt with aspects not included in the questionnaire. A wide variety of comments was received, and, although not indicated by large majorities of respondents, four areas crystallised out of these comments:

(a) Music psychological aspects of Aural Training
(b) More/other aspects of computer-assisted Aural Training
(c) Objectives and Contents of Aural Training
(d) Cultural differences
(e) Other

Other aspects were: Research in the transfer of skills e.g.: is dictation good for anything? (RSA); Connection of aural training skills to real music listening (RSA); Aspects of group instruction (FRG); Aural Training as major subject (FRG); Evaluation systems (FRG); Curriculum design (USA); Entrance requirements (FRG); Diagnosing aural problems and solving them (RSA); How to help the marginal student (RSA); A study of students who cannot match pitch, or who can only match pitches within a relatively narrow range of pitches (i.e. a perfect fifth) (USA); The transition of Aural Training into Aural Analysis (FRG); Different methods of Dictation (FRG); Individual innovations in teaching sight singing and dictation concepts and learning techniques (USA); Inner hearing (USA and FRG); Polyphonic awareness (USA); The independent work of students in Aural Training during their music studies such as meeting in small groups (FRG); Education of Aural Training lecturers (FRG); Students have great difficulty transferring shorter "sterile" examples (models) to musical contexts. Yet recitals and concerts deal with such contexts. Much more attention needs to be given to the development of aural skills applied to context (USA); Integrating Aural Training into instrumental music studies right from the beginning, integration vs differentiation (RSA); Aural Training for the general listener (amateur) (RSA); Social training by means of music (FRG); The importance of listening to each other and reacting to each other when performing with other people (FRG); Unfavourable teaching conditions such as lack of sound isolation in classrooms (FRG); Historical relativity of Aural Training (FRG); Aural Training based on not equal-tempered tuning systems and micro tonality (FRG); Acoustics, tuning systems, timbre identification/terminology (RSA); Is our only goal eye-ear correlation or is there room for oral traditions? (RSA); The question of musicality (FRG); The integration of a set of complex skills which develop out of natural musical behaviour (RSA); Achievement differences within a group of 10-12 students and the problems attached to this (FRG); The dependence (relationship) of music perception on the terminology and methodology of Music Theory (FRG); The separation of music disciplines such as Harmony and Counterpoint leads to stagnation and concentration on isolated aspects such as the root of a chord (FRG); Improvisation, keyboard harmony, discovery learning (RSA); The difference between drill (concentrating on isolated methods such as Dictation) and education (inner structure of music, analytical listening) (FRG); Intonation problems (FRG and USA); Students' attitudes towards Aural Training (FRG); Aural Training should also incorporate knowledge of the human nature (FRG); Judging musical performance (USA); Sight singing methodologies (Jersild vs structural reductions, etc.) (USA); The relationship of analysis to the teaching of aural skills (USA); The influence that various different types of hearers have on the methodology of Aural Training (FRG); Instructions to self-instruction (FRG); How to get variation in Aural Training (RSA).

The fact that 41.2% of the respondents were willing to share some of their ideas on Aural Training after having completed a seven-page questionnaire revealed a need for further Aural Training research and a lively interest in the results. It can be concluded that there was an increasing awareness amongst several Aural Training lecturers in all three countries of the importance of revising the objectives of Aural Training, taking into account music psychological research results. Due to the fact that CAT offers many possibilities for practice outside of the class, there was also a need amongst respondents to explore these. Apart from all the other interesting aspects listed in the *other* category, by addressing cultural issues respondents also indirectly voiced the desire for more international contact between Aural Training lecturers.

4. SUMMARY AND RECOMMENDATIONS

A questionnaire was used to investigate selected aspects of Aural Training found in the Republic of South Africa, the Federal Republic of Germany and the United States of America. A synopsis of the results and conclusions drawn in Section Three is presented below and serves as a basis for the recommendations.

An examination of the **primary goal** of Aural Training revealed that lecturers in the RSA saw it as a subject that merely supports other subjects. Although the majority of lecturers in both the other two countries indicated that they looked upon Aural Training as a subject with its own goals, this was indicated by only a marginal majority, thus emphasising the lack of consensus on the fundamental goal of Aural Training on the part of Aural Training lecturers.

The **secondary goals** of Aural Training that crystallised from the respondents' comments were:

The development of structural hearing
The development of inner hearing
The development of hearing strategies/hearing patterns
The development of musical understanding
The development of musical perception
The development of musical literacy
The development of practical skills
Support of other music courses
Other

Possible reasons for the lack of uniformity on the primary goal are related to different teaching philosophies pursued by, and/or the inadequate training of, Aural Training lecturers. As a result of the latter, teaching objectives are not clearly defined. This snowballs further in that students, teachers and administrators often suffer from negative attitudes towards the subject. Another side-effect of inadequate teaching systems and approaches is that primary and secondary teachers produce technically trained instrumentalists with an underdeveloped musical consciousness, who are not properly prepared for their future music studies at tertiary institutions.

Corrective actions included preparatory courses for prospective students, the offering of advanced courses and Aural Training as a second major subject at only a few institutions in the FRG and USA. According to the researcher's knowledge, no such corrective actions has taken place in the RSA.

With regard to **curricular planning and status**, Aural Training was treated as a separate subject in all three countries, indicating that it has gained enough importance to be scheduled in separate classes. Results from other investigations, however, revealed that at some tertiary institutions Aural Training grades formed a subminimum of only 10% - 50% of another subject such as Music Theory. Information on other curricular aspects revealed that the individual music departments followed diverse time schedules. Although trends of 60 minutes instruction time per week were recognised in the RSA and FRG, and 120 to 180 minutes in the USA, this was only indicated by a marginal majority. The time available depended on factors such as the seniority of the students (USA), the level of development (FRG) and the subject in which the student majored (FRG). Aural courses had to be completed within a time frame of 4 to 6 semesters. At some music departments Aural Training was divided into smaller segments (e.g. Sight Singing and Dictation classes taken separately) and extra, non-mandatory classes were available at a few *Musikhochschulen*.

Small minorities of RSA and FRG lecturers indicated that the teaching time available was sufficient. Lecturers from the USA, however, were clearly dissatisfied with their instruction time available, a fact that could on the one hand, be attributed to the larger group sizes indicated in the USA compared to the RSA and FRG. On the other hand, more instruction time was available in the USA than in the other two countries, and the dissatisfaction thus could indicate that there is a growing consciousness amongst Aural Training lecturers in the USA to recognise the importance of Aural Training. One USA lecturer summarised the dilemma surrounding sufficient time schedules as follows:

> "The time is insufficient to give most, but not all, students a true mastery of the skills we are trying to promote in the courses themselves, term by term. But some students are actually able to achieve mastery in a much shorter time. For them, however, there is insufficient time to carry them to a true mastery of aural skills, hearing large-scale forms and key relationships, four-part polyphony, etc."

It is therefore concluded that insufficient instruction time was available in all three countries.

A discrepancy between the reality and lecturers' preferences could also be seen in the dissatisfaction of the majority of lecturers in all three countries with having only group tuition. They *preferred* both individual and small group classes consisting of 2-6 (FRG), 5-8 (RSA) and 9-12 (USA) students.

Although a wide spectrum of **methods** was indicated in all three countries, drill and practice exercises overshadowed more creative and holistic approaches such as Conducting using free gestures, Graphic representations, Improvisation, Verbal descriptions using self-developed terminology, Imagination tasks and Aural Analysis. It could be clearly seen that more emphasis was placed on Sight Singing and Dictation than on other teaching methods. There is also reason to believe that most instruction time was devoted to the development of these two skills, using mainly music from the Baroque, Classic and Romantic periods. In the RSA the Tonic doh method, singing on absolute note names and neutral syllables were the most frequently used methods for Sight Singing purposes, and indirectly for the development of inner hearing. Absolute note names were used in the FRG and Tonic doh in the USA. Only six German lecturers included imagination tasks in order to develop inner hearing. Further information gathered on the aspect of structural hearing showed that Aural Training was taught only in the smaller contexts of musical phrases, and little attention was given to an overall structural approach in all three countries. Reasons for this were:

- Aural Analysis is an unknown field to me
- I find that Aural Analysis is not easily put into practice
- For advanced students
- Part of other subjects such as History of Music Courses, Advanced Theory classes, "Contemporary Technique" classes, Form and Analysis classes
- Too little time available
- Students too weak - overestimated
- Waste of time/Unnecessary: We can analyse a short synoptic excerpt (e.g. eight measures) according to all parameters
- Other

No specific questions were asked as to the teaching philosophy followed by the Aural Training lecturers. The fact that an isolated approach apparently was favoured over a more comprehensive holistic approach could, however, be seen in the drill and practice exercises emphasised in so many of the above methods.

Although the majority of lecturers revealed an **interest in subject-related articles, study groups and further research** in Aural Training, results on the methodological aspects and textbook/workbooks revealed that research results in the early 1980s in which holistic approaches to Aural Training based on music psychological findings were recommended, had only a minor influence on the teaching philosophy and methods applied. Drill and practice still reigns over comprehensive approaches, and the indicated books concentrated merely on isolated and fragmented approaches to Aural Training. It was concluded that most lecturers do not spend much time in keeping up with the latest research results.

Reasons for the general tendency amongst Aural Training lecturers to concentrate on drill exercises were sought. Based on observations and other sources, it was concluded that drill exercises provide the teacher with means to evaluate the state of the musical mind, that these exercises are readily quantifiable, need less preparation time and fit into the limited time schedule. It was finally concluded that lecturers do not consider other more creative and holistic skills to be important.

Aspects of **programmed instruction** were also addressed, with comments and results indicating that both CAT and NCAT served the purpose of homework assignments. The fear that programmed instruction will replace the teacher was thus proved to be groundless. Results furthermore indicated that the majority of tertiary institutions provided students with the ability of extra practice outside of the classroom in the form of teaching assistants to help weaker students, NCAT and/or CAT.

With regard to non-computer bound programmes, lecturers in the RSA used mainly commercially available programmes, whereas lecturers from the other two countries included self-developed tapes. These programmes were mostly used for Dictation, with the inclusion of other areas such as completion tasks, aural analysis, playing by ear, transcription, timbre recognition, examples of the entrance test and final examination requirements, comparisons of different interpretations of the same work, error detection and chord analysis. From this list it is clear that NCAT was used merely for isolated drill exercises and that only a few lecturers applied more comprehensive approaches such as Aural Analysis and Comparisons of different Interpretations of the same work.

Major differences between the three countries were noticed in the area of Computer-assisted Aural Training. Whereas a moderate RSA and fairly large USA majority of lecturers included this form of programmed instruction, a very large majority of FRG lecturers omitted CAT from their curricula. The main reasons for not making use of CAT were: lack of adequate knowledge about the available software, uneasiness about the synthesized sounds used and the complex technical environment involved, the limitations of programs, and the financial commitment attached to using CAT. Most lecturers, however, showed an interest in attending a workshop on CAT, and indicated that they would be interested in improved software that concentrates on contextual and holistic approaches to CAT. The possibility of including their own examples from the music literature in software was indicated by the majority of lecturers. Other choices included software for Sight Singing purposes, Completion tasks, Aural Analysis and the possibility of manipulating music on CD for Aural Training purposes.

The use of IBM/IBM compatible computers (RSA), Atari (FRG) and Apple and Macintosh (USA) computers formed the core of the indicated hardware. As to the aspect of sound generation, sound cards (RSA), synthesizers and sample players (FRG and USA) were indicated by the majority of computer users. They furthermore indicated the use of *Guido* (RSA), *Audimax* (FRG), as well as self-programmed software and software published by *Temporal Acuity*

Products, *Practica Musica* and *McGamut* (USA). Only one lecturer indicated the use of CD-ROM programs. Results by lecturers who applied CAT indicated that it was efficient regarding drill and practice software, and that the achievements of students had improved noticeably in the areas of interval awareness, dictation and harmonic-functional hearing. Comprehensive approaches to CAT were almost non-existent and it was concluded that Aural Training software in its current state has a limited scope to improve skills.

"Availability," "familiarity" and "least worst" were the reasons provided for the choices of the abovementioned software. It is therefore not surprising that the majority of lecturers who developed their own software indicated that they were not satisfied with commercially available software. Some of these self-developed programs included methods such as 'playing by ear', aspects of aural analysis, the conversion of input into notation and the possibility of playing a CD.

Aspects not included in the questionnaire were finally dealt with. Four areas could be vaguely determined from a wide spectrum of answers received: Music psychological aspects, More/other aspects of CAT, Objectives and Contents of Aural Training, and Cultural differences. These four areas revealed an acknowledgement of the need to re-examine the objectives of Aural Training in order to incorporate music psychological research results. There was also a desire to be informed about newer trends, such as CAT, and to establish international contact between the different countries.

Against the background of the above picture of Aural Training in the RSA, FRG and USA, the following recommendations are made:

(a) An urgent need exists for the proper education of future Aural Training lecturers. The incorporation of advanced courses for students interested in majoring in Aural Training is therefore recommended for **all** tertiary music institutions. It is furthermore strongly recommended that **all** universities and *Musikhochschulen* offer courses in the didactics of Aural Training to **all** music students, and not just to students majoring in Aural Training. In this course, which should be at least two semesters long, students should become acquainted with the objectives of Aural Training, different teaching philosophies, contents, learning theories based on music psychological research and ways of integrating Aural Training into instrumental lessons. The further incorporation of trial lessons into the curriculum will not only provide students with the possibility of gathering teaching experience, but will also provide more Aural Training practice for fellow classmates. The need for such courses is especially evident in the RSA where advanced courses and entrance tests in Aural Training are not the norm.

(b) Aural Training should start as soon as possible on an elementary level, and should form an integrated part of instrumental music instruction.

(c) In order to fully acknowledge the importance of Aural Training, it should by no means form a subminimum of any other subject, but should be treated as a subject in its own right in grading policies.

(d) Since the instruction time is insufficient and lecturers preferred both individual and group tuition in small groups of 5-10 students per group, it is recommended that the curriculum planning at most tertiary music institutions should be revised. Most prospective music students do not have an adequate background in rudimentary Aural Training, and courses should therefore form part of the whole undergraduate study period in order for students to rise above the elementary level. To allow for the inclusion of both individual and group tuition, a minimum of 120 to 180 minutes weekly per student is recommended. A possible time schedule could be: 30 minutes individual tuition, 2 x 45 minutes group tuition and a 60-minute seminar for comprehensive Aural Training, including methods such as Aural Analysis, Comparisons of different interpretations of the same work, Imagination of whole works, etc. Through the presentation of non-mandatory subjects, themes such as Rhythm in the Twentieth Century, The Development of the Sonata in the Classical and Romantic periods, etc. can be treated from an aural perspective. Experimental Aural Training, experimenting with the weaknesses and strengths of the musical ear can also be presented in these classes in the form of small-scale investigations.

(e) It is recommended very strongly that behaviourist principles in the form of drill and practice of fragments should be banned from Aural Training, and that a comprehensive holistic approach should take their place. The training of isolated parameters such as the recognition and performance of isolated intervals and chords should be replaced by contextual Aural Training. This also implies that Dictation and Sight singing should be taught from a holistic perspective, paying attention to the overall form scheme, i.e. structural hearing on a macroscopic level. Other less readily quantifiable and more creative methods such as Conducting using free gestures, Completion tasks, Graphic representations, Composition, Improvisation, Verbal descriptions using self-developed terminology, Score reading, Imagination tasks, and Aural Analysis should receive more attention in order to balance the unhealthy emphasis on Sight Singing and Dictation. Macroscopic structural hearing should be included in Aural Training courses right from the beginning. It is *not* a listening process accessible only to advanced students. According to music psychological research, contours and overall structural characteristics are perceived first, not details. The level of detail that can be included after several hearings will of course differ according to the student's level of development. This is, however, no reason for withholding macroscopical listening experiences from freshmen. Just how "advanced" the student is, is anyway a relative matter.

(f) The holistic teaching philosophy described above should also be applied to all areas of programmed instruction. Computer software should be revised in order to incorporate methods other than mere drill and practice. The possibilities that CD-ROM and MIDI hold for Aural Training should be explored by programmers with the attitude that software should serve the pedagogical goals and not vice versa. There are too many programs on the market in which goals were adapted to the limitations of the computer. Unfortunately many lecturers do not show *enough* interest in CAT and therefore do not exercise their ability to influence software programming. It is therefore furthermore recommended that workshops should be presented in order to introduce software and discuss the advantages and disadvantages of different programs. Not only should programmers start to "dream" and develop their ideas about software, but also Aural Training lecturers in order to influence the contents of programs.

(g) The aquisition of more than one computer program is recommended per music department, as the programs are not all the same, but support each other and cover different areas of Aural Training.

(h) Evaluation policies should be re-examined in order to develop assessment techniques for methods other than Sight singing and Dictation.

(i) Regarding the contents and teaching material of Aural Training, it is recommended that music examples from all style periods should be included and not primarily tonal music. The need also exists for Aural Training literature based on comprehensive teaching philosophies. Music from different ethnic groups should also be included in the syllabi of all three countries, and especially in the RSA. It is therefore recommended that an Aural Training text, taking into account both comprehensive approaches and indigenous South African music, should be published.

(j) Lecturers should keep up with the latest trends and research results and find ways of incorporating these into their Aural Training programmes in order to avoid the application of inefficient methods, or the omission of other valuable newer methods. It is also recommended that international contact between different Aural Training departments should be established and that international conferences should be held periodically.

(k) More research should be done in the field of music psychological applications to Aural Training, the objectives and contents of Aural Training, computer-assisted Aural Training and cultural differences.

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CHAPTER FOUR

A model for aural instruction

The fact that there are certain shortcomings in the didactics of Aural Training was clearly seen in the previous chapter. Two of the neglected areas addressed were the need for an application of music psychological principles to Aural Training, and the necessity to prepare prospective students for their future music studies. It was therefore recommended, amongst other things, that Aural Training should start as early as possible and should form an integrated part of instrumental lessons, taking into account music psychological principles.

The purpose of Chapter Four therefore is to (a) briefly introduce various music psychological research trends, and (b) present a model for Aural Training for children, taking into account various music psychological research results.

1. MUSIC PSYCHOLOGICAL RESEARCH

> "...whilst the scientific study of music might with some justification be seen as a rather dull, unexciting and concrete-minded thing to undertake, in the sense that it has none of the beauty or poetic appeal of the actual subject matter, it can serve a very useful purpose in exposing certain beliefs as pure mysticism; hopefully, in this process, making such things as 'good taste', 'sensitivity', 'musical understanding', and so on, into comprehensible entities common in varying degrees to almost all people, rather than magical properties of some sort of musical priesthood."[1]

The first endeavour to apply principles of musical psychoacoustics[2] to other music disciplines is to be found in Hermann von Helmholtz's publication *Die Lehre von den Tonempfindung als physiologische Grundlage für die Theorie der Musik* (1863), in which he maintained that Music Theory could only be understood fully when it is shown that its elements had their origin in the perceptual characteristics of the hearing organ. Because Music Theory, and for that matter Aural Training, has its own rules apart from the perceptual relevance of the characteristics of the sounds that it creates, it is not clear which aspects of Music Theory should be subjected to psychoacoustical research.[3]

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1 John Booth Davies, **The Psychology of Music**. Stanford, California: Stanford University Press, 1978 p. 15.

2 "Psychoacoustics is an empirical or, rather, experimental science. Observations from daily life and informal tryouts may be starting points for psychoacoustical knowledge, but the core of the scientific content is the result of laboratory investigations. ... A *psychoacoustical experiment* can be described most simply in a stimulus-response scheme. The *stimulus* is the sound presented to the subject. The experimenter requires the subject to give a *response*. The experimenter tries to discover the relationship between stimilus and response characteristic. ... Psychoacoustical research is often carried out in terms of sensory processes. Such attempts are made in research that is labeled physiological acoustics, a part of sensory neurophysiology."
R.A. Rasch and R. Plomp, "The Perception of Musical Tones" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982 p. 2.

3 R.A. Rasch and R. Plomp, "The Perception of Musical Tones" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982 p. 21.

The physiological process that takes place in the ear when sound waves enter it has nothing to do with the mental organization that takes place in the brain. The ear hears, but it does not organise. In order to define a melody ('make a tune'), certain mental abilities are exercised, implying that listening is not a passive process of mere reception, but one of active construction.[4] Because of the mental activities involved in understanding/constructing what was heard, or anticipating what is going to be heard, knowledge of aural perception, aspects of developmental psychology and musical thinking processes are vital to the teaching of Aural Training.

There are, however, a few rudimentary reservations connected to a direct application of appropriate music psychological aspects to Aural Training. The very young discipline of Music Psychology first drew major attention with Ernst Kurth's publication of *Musikpsychologie* in 1930.[5] Because of the primitive level of technology during the first half of the twentieth century, music psychologists were also hampered in their investigations by, for example, the low quality of tape recordings and primitive sound sources/synthesizers. It is only in the last decade that the computer has enabled and simplified complex investigations. It is therefore not surprising that at the international Symposium *Wahrnehmen-Lernen-Verstehen* held in Freiburg in 1991, several speakers warned that music psychological research results had to be applied to Music Education with caution.[6]

Influenced by the Behaviourist school of thinking which dominates general Education and Music Education,[7] many research endeavours on aural perception concentrate on investigating isolated sound concepts such as interval recognition outside of musical contexts. The complexity of aural perception and the internal characteristics of music speak against such simplified research approaches found in, for example, the studies of Valentine (1962), Bernd Enders (1981) and Don B. Gibson (1986).

Valentine unsuccessfully tried to discover if subjects would agree on descriptions of the emotional effect of single intervals,[8] whereas Enders examined the ability to distinguish between the individual tones of chords, and the ability to hear intonation inflections of individually played chords.[9] By expecting his subjects to indicate whether the played 39, two-chord pairs (four voices) had some degree of similarity or not, Gibson attempted to determine if, according to the operations of transposition and inversion of the Pitch-Class Theory, the chord pairs are perceived as being equivalent or not. The results denied a relationship between the aural perceptions and the theoretical qualities of the

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4 John Booth Davies, **The Psychology of Music**. Stanford, California: Stanford University Press, 1978 p. 82.

5 Theodor Warner, **Das Undurchhörbare - Beiträge zur Hörpsychologie und Didaktik der Moderne.** Stuttgart: W. Kohlhammer, 1969 p. 13.

6 International Symposium **Wahrnehmen-Lernen-Verstehen** attended by the researcher, held at the *Staatliche Hochschule für Musik Freiburg/Breisgau* on the 23rd and 24th of November 1991.

7 David J. Hargreaves, **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986 p. 226.

8 Keith Swanwick, **Music, Mind, and Education.** London: Routledge, 1988 p. 22.

9 Bernd Enders, **Studien zur Durchhörbarkeit und Intonationsbeurteilung von Akkorden**. Regensburg: Gustav Bosse, 1981.

chords. Gibson, however, concluded that an evaluation of this relationship is not possible without reference to a musical context, and that meaningful perception also depends upon learned discrimination.[10]

A welcome exception to the above endeavours was found in the context-based investigations of Hans-Reinhard Biock, and Stephan Schellenberg and Randall S. Moore. Biock examined the dependance of interval intonation estimation upon the musical context and found that the estimation of the intonation of an interval depends on the preceding interval and on the timbre of the instrument used. He furthermore concluded that no global valid optimal interval size exists, and that isolated intervals treated outside of a musical context have little value for musical practice.[11] Schellenberg and Moore found that the tonal-rhythmic context had an enormous effect on short-term memory for both parameters, in that a complete context simplifies the learning process.[12]

According to Keith Swanwick, investigations based on isolated concepts do not explain what music really means to people. In the same way as an increase in pulse rate or respiration, often observed when people listen to certain kinds of music, reveals little about their perceptual and affective worlds, correct or incorrect identification of pitch change or identifying the number of notes in a chord only "begins to scratch the surface of how people construe and respond to music."[13]

Although Music Psychology is a fairly young discipline and many research endeavours concentrate on investigating isolated aspects of musical perception, Aural Training can benefit from a closer look at selected research results presented in the following sections:

1.1 *Gestalt* perception
1.2 Developmental psychology
1.3 Musical thinking processes

1.1 *Gestalt* perception

The treatment of elements isolated from a musical context have, compared to the same elements occurring in the context of a piece of music, no depth or emotional significance. The whole is greater than the sum of the parts, implying that music is not merely perceived as a succession of notes, but possesses a form-like quality which gives it definition, depth and closure. Although researchers often debate about what exactly allows for this form to take place, they generally agree that some type of organizational process is involved in structuring this form.[14]

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10 Don B. Gibson, "The Aural Perception of Nontraditional Chords in Selected Theoretical Relationships: A Computer-Generated Experiment" in **Journal of Research in Music Education**, 34/1 (1986) pp. 5-23.

11 Hans-Reinhard Biock, **Zur Intonationsbeurteilung kontextbezogener sukzessiver Intervalle.** Regensburg: Gustav Bosse, 1975.

12 Stephen Schellenberg and Randall S. Moore, "The Effect of Tonal-Rhythmic Context on Short-Term Memory of Rhythmic and Melodic Sequences" in **Bulletin of the Council for Research in Music Education**, 33/2 (Fall 1985) pp. 207-217.

13 Keith Swanwick, **Music, Mind, and Education.** London: Routledge, 1988 p. 23.

14 Catherine Estelle Campenni, **Contour and Rhythm as Determinants of the Perceptual Organization of Complex Auditory Stimuli.** Doctoral dissertation, Adelphi University 1987. Ann Arbor, Michigan: University Microfilms International, 1987 p. 3.

Edward M. Burns and W. Dixon Ward pointed out that the ability to label individual intervals is not crucial to the perception or production of music. They referred to this isolated treatment as 'categorical perception', which may be only relevant when musicians apply aural analysis techniques, or if they transcribe a melody.[15] Burton S. Rosner and Leonard B. Meyer furthermore emphasised the importance of the perception of 'archetypes'. Culturally competent audiences perceive, comprehend and respond to works of art as a result of basic archetype frameworks. What is perceived, enjoyed and appreciated is not the succession of stimuli, but the relationships between them.[16]

This tendency to see or hear overall patterns (*Gestalten*) depends on a person's experience and learning, and forms the core of *Gestalt* psychology which originated in the early 1900s as a result of the theories of Wertheimer, Kohler and Koffka.[17] *Gestalt* psychologists furthermore proposed that stimuli are grouped into configurations (patterns) according to various principles such as *proximity* (nearer elements are grouped together in preference to those that are spaced further apart), *similarity* (configurations are formed out of similar elements), *good continuation* (elements that follow each other in a given direction are perceived together) and *common fate* (elements which move in the same direction are perceived together). When a musical phrase is heard, perceptual grouping in music is a very complex process. Stimuli are fragmented into their separate attributes (for example fundamental pitch, loudness, timbre), followed by a process of perceptual synthesis in which the different attribute values are recombined in other ways, creating illusionary percepts. An example of this process was seen in the following experiment: tones from a ascending and descending major scale were delivered simultaneously to both ears of a subject, with the successive tones in each scale alternating from ear to ear. Results showed that the majority of listeners perceived two melodic lines, namely a higher one and a lower one, that move in contrary motion. The higher tones appeared to the listeners as stemming from one earphone, and the lower tones from the other. Organization thus took place on the basis of frequency proximity and not spatial location.[18]

Also based on the principles of the *Gestalt* theory, children apparently first perceive the general contour of pitch organization of a melody, followed by a gradual recognition of the other characteristics of the melody. In an investigation of children aged 5 to 13 years, Karin Poppensieker examined the recognition of invariant melodic structures when timbre and rhythm were changed, or when a melody was transposed, or if variation appeared in more than one parameter.[19] Three examples, for instance, were played in the timbre subtest. Two of the melodies played by different instruments had exactly the same pitch content, whereas the pitch content was slightly changed in the other melody. The subjects had to indicate which melody had been changed. Results indicated that 5- and 6-year-old

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15 Edward M. Burns and W. Dixon Ward, "Intervals, Scales and Tuning" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982 pp. 266-267.

16 Burton S. Rosner and Leonard B. Meyer, "Melodic Processes and the Perception of Music" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982 pp. 317-340.

17 John Booth Davies, **The Psychology of Music**. Stanford, California: Stanford University Press, 1978 p. 83-85.

18 Diana Deutsch, "Grouping Mechanisms in Music" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982 pp. 100-102.

19 The research endeavours of Poppensieker and Upitis discussed in the *Gestalt* Perception section also fall in the category of Developmental Psychology discussed in section 1.2. The latter deals with aspects of *Gestalt* perception development at certain ages.

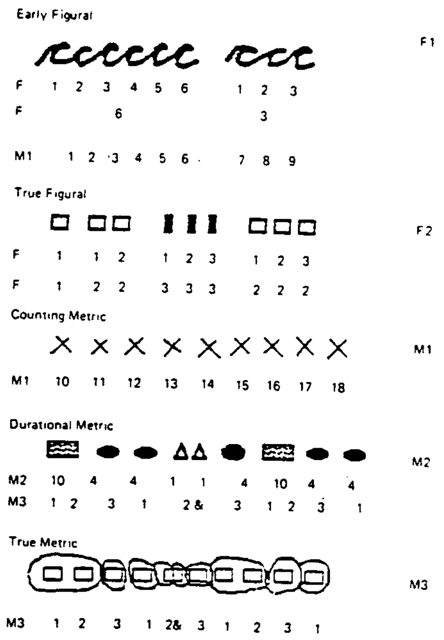
children were able to recognise invariant melodic structures when the rhythm was varied. Children in same age group were also able to recognise invariant melodic structures when more than one of the other parameters were changed. Between 7 and 8 years of age, children had an increasing ability to distinguish between timbre and pitch. It was only at 9 to 10 years of age that the children were able to recognise invariant melodic structures when a melody was transposed to a different key. There was also a very clear relationship between the test results and musical knowledge (education) of the subjects. Poppensieker concluded that (a) aural perception developed increasingly with age, (b) pitch, rhythm, timbre and harmony are perceived easier as a whole, and (c) that *Gestalt* perception depends also on learning and not merely on 'musicality'. She recommended the conscious development of the ability to perceive patterns.[20]

The listener's ability to naturally organise the heard sounds (in this particular case rhythms) into meaningful groups or figures was also examined by Rena Upitis. She defined musical rhythm broadly as "the temporal structure of music created by the progression of notes, including relations among the various musical dimensions such as melody, harmony, duration, and timbre." Upitis furthermore distinguished between figural and metric organization. Figural organization is concerned with the ability to perceive small clusters (at the most five notes) as related to each other in such a way that any single event in the figure is only meaningful in relation to the other events. Metric organization refers to the listeners' ability to respond to "an underlying system of regular or invariant patterns of beats" regardless of the variation in duration that takes place on the surface.

The extent to which 7- to 12-year-old children apply these two types of rhythmic organization was examined by Upitis. Using very simple graphical dictation methods, "rhythm" reading from different graphical scores, keeping time exercises, and other more complex exercises (for example, finding the suitable beat for an unknown melody, creating a "score" for three drummers of which one should play a fast beat, another a medium beat and a third a slow beat, describing the beats of a shown "score"), she found that: the graphic descriptions could be categorised in the Bamberger typology of *iconic* (pictures describing the activity such as a pair of clapping hands or the instrument used to perform the activity), *figural* and *metric presentations*. Five levels of the last two presentation forms were also distinguished and are presented in the following Figure.

20 Karin Poppensieker, **Musikpädagogik - Forschung und Lehre, Band 23: Die Entwicklung musikalischer Wahrnehmungsfähigkeit**. Mainz: Schott, 1986 pp. 83-113.

Fig. 4.1 Upitis: Graphic and numeric descriptions of the triple non-symmetrical rhythm



Two stages of figural and three stages of metric presentations were distinguished. In *early figural* drawings the child "plays" the rhythm on the paper, lifting the pencil when one figure stops and putting the pencil down when the next figure begins. Numeric descriptions indicated that the number of events were simply counted and added for each figure. In *true figural* drawings each of the events was symbolised with a discrete marking, which often varied according to the duration. Numeric descriptions revealed that children often used one number for each mark in the figure, starting with a new sequential count for each figure. *Counting metric* drawings did not differentiate events by duration, but merely recorded the number of discrete events with identical markings for each event. The numeric descriptions used by children are simply a series of sequential numbers, one for each event. In *durational metric* drawings the same type of marking was applied for similar durations, regardless of where the events occurred within the sequence. The same principle was used in the numeric descriptions, where the same number was assigned to similar durations. The last level of *true metric* drawings represented the use of consistent symbols for each of the durations. The symbols could be mathematically related to one another to portray the relative durations for each of the surface events. A square may be, for example, used as a unit, and therefore two half-squares would indicate two equal events occurring in the time of a square.

Further findings indicated that all children, regardless of age and prior musical experience, were able to understand both metric and figural descriptions to a certain extent. The ability to make and read figural and metric forms was also a direct function of age and training. Metric descriptions of rhythm were on a higher level of rhythm cognition, and were preceded by figural organization. There is, however, a tendency in traditional instruction to emphasise the metric aspects of rhythmic structure over figural aspects. The role of figural organization is underplayed and teachers are taking the risk of using terminology that children cannot understand, because metric notation may not match their internal figural representations.[21]

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21 Rena Upitis, "Toward a Model for Rhythm Development" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development.** New York: Springer, 1987 pp. 54-79.

Quoting Stadler, Gertrud Meyer-Denkman pointed out that the development of *Gestalt* perception is also connected to a more detailed classification of elements as well as the building of more complex patterns. It is thus wrong to choose either a merely isolated approach in which a course consists of the smallest thinkable learning steps, or dealing only with a very general global approach to Music Education. Both approaches should be incorporated.[22] This teaching approach was also recommended by Emily Ruth Brink, who suggested the incorporation of both perceptual and structural tasks.[23]

1.2 Developmental Psychology

Developmental psychology attempts to describe the musical growth that takes place in children at certain stages of their lives. Newer trends in this discipline also put an increasing emphasis on a 'life-span' approach, in which behavioural changes in adulthood are also incorporated.[24] The following discussion on musical growth will, however, concentrate only on children aged 7 to 12 years of age, because most children start their instrumental music studies in this time bracket. Another reason for this limitation is that the researcher-developed model of integrated Aural Training discussed in section two, concentrates on incorporating Aural Training into instrumental lessons, starting from the very beginning.

First of all, the developmental theories of Piaget, Gardner and Swanwick-Tillman will be introduced. Secondly, other research results will be summarised in order to complete the picture of the developmental level of 7- to 12-year-old children.

The structural cognitive-based developmental theory of Jean Piaget has been referred to by many authors in connection with the nature of the mind and the acquisition of musical knowledge. In his epistemological approach to the domain of physical and logical-mathematical thinking, Piaget determined a universal, invariant sequence of four main stages of development, of which each serves as a preparation for the next:

> *Sensory-motor intelligence (index level)* (0-2 years of age): The child reacts to his environment mainly through his own perception (reflexes and senses) and actions upon it. He is capable of delayed imitation and starts to use his body in the simplest form of symbolic play, that of enacting images.
>
> *Pre-operational intelligence (intuitive or symbolic thought)* (2-7 years of age): Symbols such as language, mental images, and others are used to refer to the world which the child had previously known directly only through reacting to it. This use of symbols is, however, still static in the sense that the child cannot manipulate the 'images' that he carries about in his head. This phase is also characterised by imitative behavioural patterns.

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22 Gertrud Meyer-Denkman, "Wahrnehmungspsychologische und neurophysiologische Aspekte des Musiklernens" in Günter Kleinen (Ed.), **Musikpädagogische Forschung, Band 5: Kind und Musik**. Laaber: Laaber, 1984 p. 157.

23 Emily Ruth Brink, **A Cognitive Approach to the teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University Evanston Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 99-107.

24 David J. Hargreaves, **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986 p. 1.

Concrete operational intelligence (7-11 years of age): Mental operations such as classification, an understanding of spatial relationships and the ability to organise (group) elements are present. The operations of conservation and reversibility are important in this phase.[25] Operations are broadly defined as representational acts being organised into a functioning whole, related to other such systems. Operations can be recombined in order to produce new operations, to cancel or undo other operations.

Formal operational intelligence (sign level) (12-15 years of age): Operations are conducted using logical and abstract hypothetical thinking. Events can be compared to each other and their own thoughts can be evaluated. Equations can be written, propositions be uttered, and logical manipulations upon strings of symbols can be performed by, for example, combining them, contrasting them, negating them.[26]

His theory is furthermore based on the assumption that knowledge is not innately predetermined, but is constructed through the interaction of the child with his environment. Development is influenced by maturation, experience, social transmission and equilibration. Through *equilibration*, cognitive structures are developed towards greater levels of differentiation, integration and adaption. This process of equilibration furthermore involves the processes of *assimilation* (integration of external elements into evolving or completed cognitive structures) and *accommodation* (modification of cognitive structures by the assimilated elements). Through these processes qualitatively different and higher modes of understanding are reached. Newly encountered objects and events are assimilated and accommodated by changing the ways of thinking about them. As a result of this, a new level of equilibration is entered.

As mentioned earlier, this theory captured the attention of many music psychologists. The applications of Marilyn Pflederer-Zimmerman and Emily Ruth Brink are only two examples among many. According to Brink, physical motion or drawings are used to represent musical events between the pre-operational and operational intellectual levels. Dictation tasks, for example, require formal operation in that the melody is first perceived and then mentally reconstructed in order to form meaningful concepts about it. This perceptual-conceptual knowledge is finally represented at the sign level through notation of the mental reconstruction of the melody.[27]

Most of the research done on the implications of Piaget's theory for music development, concentrated on the area of musical conservation, which is defined as the ability to understand theme and variation in music. Pflederer-Zimmerman, for example, proposed five laws of musical conservation: *identity* (conservation of melody with change in timbre), *metrical groupings* (conservation in meter with change in rhythm), *augmentation and diminution*

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25 "Piaget's original experiments in conservation involve physical quantities that undergo transformations in appearance, but not in physical amount. ... For example, in the conservation of liquid task, the child is shown two identical glasses containing the same amount of water. Once the child agrees that each glass has the same amount, the contents of one glass are poured into another glass of a different size and shape. Typically, children below the age of 6 or 7 claim that the amount of water changes when it is poured into the other glass. ... In contrast to younger, older children maintain that the amount of water remains the same ... . The response of the older child reflects an ability to decenter and to perform a reversible operation. In the case of conservation, the most important of these operations involves an understanding of reciprocity or compensation. The ability to perform reversible operations is a characteristic of the concrete operational stage of development."
Carolyn Hildebrandt, quoting Piaget, "Structural-Developmental Research in Music: Conservation and Representation" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 p. 82.

26 Jean Piaget, **The Psychology of Intelligence**. Totowa, New Jersey: Littlefield, 1960 pp. 106-125.

27 Emily Ruth Brink, **A Cognitive Approach to the teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980 pp. 69-70.

(conservation of melody with change in tempo) *transposition* (conservation of melody with change in key), *inversion* (conservation of harmony with chord inversion).[28] Although, according to Pflederer-Zimmerman, a wide variety of Piagetian music results were presented, general trends indicated that at about the age of 9 qualitative changes in children's thinking begin to occur, and by the age of 14 formal operational music thought was observed.[29]

Hildebrandt, however, criticised Pflederer-Zimmerman, because her use of the Piagetian term *conservation* differs in its formulation from that of Piaget. Three of the abovementioned laws do no define the properties of concrete operational structures in music, because they do not define musical attributes that remain the same under given transformations. Only the conservation of meter under rhythmic variation and the conservation of rhythm under tempo variation involves compensation or reciprocity in the Piagetian sense.[30] David J. Hargreaves also pointed out that the musical tasks differ from the Piagetian tasks, in that the child cannot *observe* the transformations as was the case in the Piagetian tasks. This is because musical events are ordered in the dimension of time, and two versions of a melody cannot be attended to at the same time.[31]

The unavoidable question arises as to the value of the application of Piaget's theory to Music Education, if some of these applications have been criticised. Due to the fact that the attributes of music differ in nature and character to those of physical and logical-mathematical thinking, direct parallels cannot be drawn between the Piaget definition of conservation, and what was defined as musical conservation. What is more important, however, is the fact that valuable knowledge about what children can achieve at certain ages was explored through these research endevours applying Piaget's theory, and some general correlations between music development and logic-mathematical thinking were determined.

Although Howard Gardner pointed out that Piaget neglected central aspects of human cognition by basically ignoring the sophisticated forms of thinking involved in literature, art and music, Gardner did refer to similarities between his theory and that of Piaget. In an attempt to integrate affect and cognition, Gardner developed an informal model of artistic development based upon empirical research conducted by many investigators in the Harvard Project Zero, and his own observations, impressions and intuitions as a parent, teacher and reader.

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28 David J. Hargreaves, **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986 p. 46.

29 Marilyn Pflederer-Zimmerman, "Music Development in Middle Childhood: A Summary of Selected Research Studies" in **Bulletin of the Council for Research in Music Education**, Winter 1986 pp. 23-26.

30 Carolyn Hildebrandt, "Structural-Developmental Research in Music: Conservation and Representation" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 pp. 84-85.

31 David J. Hargreaves, **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986 p. 46.

Along with Dennis Wolf, Gardner proposed four major stages of artistic development:

The child as direct communicator
The child as symbol user
The youth as craftsman
The youth as critic and full participant in the artistic process.[32]

There is a remarkable similarity between Gardner's and Piaget's first two stages of development. The child's first encounters with his environment through basic sensory activities and motoric movement serve as a prerequisite for artistic activity in the sense that they awake the child to various means of communication. These activities are, however, not directly involved in the Arts, because of the Arts' unique involvement with the understanding and manipulation of symbol systems such as various sounds, lines, colours, shapes, objects, forms and patterns. These all have the potential to refer to, exemplify or express some aspects of the world.

Between the ages of 2 to 7 the child's capacity to use, manipulate, transform and comprehend various symbols matures rapidly. This development was seen in children from all cultures, regardless of different educational systems. Gardner and his colleagues observed an initial grasp of the major symbolic medium of the 7-year-old child's culture seen in his ability to sense what occurs within a piece of music, and the ability to combine fragments to produce a new piece in a familiar style. This same sense of composition, balance and construction was observed in the child's work in the visual or plastic arts.

> "With what I hope will be regarded as benign exaggeration, I have suggested that the young child of this age is an incipient artist. By this I mean that he now possesses the raw materials to become involved in the artistic process: a 'first draft' notion of how symbols work in a raft of symbolic media, some knowledge of how to construe a work, some capacity to construct one on his own. Indeed, he can enact the roles of performer, artist, and member of an audience. Only when it comes to the task of being a critic - who, like Piaget's formal operator, must be able to reason on the level of words or logical propositions - is the young school child significantly deficient."

In order to develop as a mature artist the child needs (a) additional knowledge about the medium, (b) more understanding of the culture in which he lives, (c) an increased flexibility in the way that he regards artistic objects, (d) greater psychological insight into human nature, and (e) superior technical skills to permit him the desired effects in a particular medium. Although this development may require a lifetime, Gardner maintained that no new level of cognitive operation is required in order for the child to participate fully in the artistic process. What is needed is not a new qualitatively different level of thinking, but a quantitative approach which implies an in-depth study. In this particular argument is contained the major difference between the theories of Piaget and Gardner. According to Gardner, Piaget's phases of concrete and formal operational thought needed for the development of the scientist are not directly relevant to the artist's task.

The 7-year-old child has not only gained enough of an intuitive familiarity with symbol systems to be able to work with them adequately on an elementary level, but also is preeminently equipped to learn. New skills are acquired within a short time with a joy that is a characteristic of this age. They are not anxious about the use of terminology or about making errors, and these years are often described as 'the golden age of creativity'.

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32 Marilyn Pflederer-Zimmerman, "Music Development in Middle Childhood: A Summary of Selected Research Studies" in **Bulletin of the Council for Research in Music Education**, Winter 1986 p. 20.

Unfortunately this enthusiasm about acquiring skills in the Arts and the capacity to fully "immerse" himself in an expressive medium seem to lack in most adolescents. As this phenomenon cannot be related to the student being less intelligent or motivated, Gardner referred to Piaget's theory that during adolescence critical reasoning skills are developed. This results in the student viewing his own work more critically by comparing it to that of highly skilled artists. Their own attempts often appear inadequate in comparison to that of other artists, and because of this, motivation declines.

Gardner strongly emphasised the role of education during the pre-adolescent period, in order to prevent this decline of interest. Children should be motivated to develop to a sufficiently high level during this period, in order to prevent the urge to reject their own artistic works at a later stage. Children should also be encouraged to take a more critical view of their own work during pre-adolescence. By presenting the child with problems, exposing him to various solutions, and providing the opportunity to evaluate and improve his own work, he can become familiar with critical reasoning abilities before he reaches adolescence.[33]

Swanwick and June Tillman actually developed a theory of musical development based on "compositions" of children aged 13 to 15 years, coming from many different ethnic and cultural groups. The term composition was used for the "briefest utterance as well as more sustained invention", with or without notation. Over a period of four years 745 composition of 48 children were gathered. The children were provided with several Orff and percussion instruments, and were also encouraged to use their voices. After a child was satisfied with his composition and could repeat it twice, it was recorded. The repetition of the composition served the purpose of investigating whether the child could remember what he had composed, and the extent to which this took place. After analysing the compositions, different trends linked to age could be distinguished, and four developmental modes were determined. These modes, or so-called 'transformations', are both cumulative and cyclical. Problems attached to, for example, the first stage, appear every time that a new instrument or new idiom is handled.

> *Mastery: sensory and manipulative* (0-4 years of age): Pure sensory delight in sounds is transformed into an urge for mastery. Children are fascinated with dynamic levels and different timbres. The elements of music are disorganised, the pulse unsteady and the use of timbre has no clear structural or expressive meaning. After the age of three, children show an interest in handling instruments, start to organise a regular pulse and use techniques related to different instruments such as glissandi, tremolos, trills, etc. Compositions are fairly long and "wild" with repetitions of the mastered skill such as glissandi.
>
> *Imitative thinking: personal expression and the vernacular* (4-9 years of age): Personal vocal expressions such as deliberate changes of speed and loudness levels appear in a rather unstructured spontaneous way. The vernacular mode becomes visible at the age of 5 and is clearly established at the age of 7 to 8. During this phase the use of patterns such as repeated melodic and rhythmic figures can be observed. Short pieces are produced in applying general musical conventions such as two-, four- or eight-bar melodic phrases in common metrical organization, often with the use of syncopation, melodic and rhythmic ostinati and sequences. Existing melodies are sometimes presented as their own compositions.
>
> *Imaginative play: speculation and the idiomatic* (10-15 years of age): Although not fully integrated in the style of the piece, speculation, experimenting with new material, often appears in compositions. Structural possibilities and ways to contrast or vary musical ideas are explored. This can often be observed in a novel ending of a melody that follows established norms. At the age of 13-14, structural "surprises" are more fully integrated into a recognizable style. Based on copied models and clear popular idiomatic practices, contrast

33 Howard Gardner, **Art, Mind and Brain - A Cognitive Approach to Creativity.** New York: Basic Books, 1982 pp. 86-109, 208-217.

and variation are incorporated. Emphasis is placed on harmonic and instrumental authenticity, answering phrases, call and response, variation and elaboration and contrasting sections that crystallise in longer, more complex technical, expressive and structural compositions. A growing urge to enter the adult world is reflected in the imitation of the musical styles of, for example, pop stars.

Meta-cognition: symbolic and the systematic (15+): The term meta-cognition usually describes the process of becoming aware of and articulating ideas of their own thought processes. At the symbolic level, a strong personal identification with particular pieces of music, a growing consciousness of its affective qualities, a tendency to think about the musical experience and communicate it to others, can be observed. The systematic level is characterised by the ability to reflect on, and communicate experiences in intellectual, organised ways. Musical compositions may be influenced by the study of new systems such as tone-rows, and/or organizing principles, containing an element of musical theorizing. "... the universe of musical discourse is expanded, reflected upon, discussed and celebrated with others."

Swanwick furthermore maintained that this model of musical development can also be applied to the performer, music listener and music critic.[34]

Against the background of the above developmental theories and other research results, the following synoptic Table on increasing musical intelligence was constructed. Because the Piaget theory did show some correlation with the other two theories, it was also included.[35] Researchers often differ slightly about the exact age of a specific development, and only general trends were incorporated into the Table.

34 Keith Swanwick, **Music, Mind, and Education.** London: Routledge, 1988 pp. 52-87.

35 W. Jay Dowling, "Melodic Information Processing and Its Development" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982 pp. 413-429.
Marianne Hassler, **Musikalisches Talent und räumliche Begabung**. Doctoral dissertation, Eberhard-Karls-University Tübingen, 1984. Tübingen: Bölk, 1984.
Marianne Hassler, "Kompositionstalent bei Mädchen und räumliche Begabung" in Klaus-Ernst Behne, Günter Kleinen and Helga de la Motte-Haber (Eds), **Musik Psychologie - Empirische Forschungen - Ästhetische Experimente,** 2, 1985 pp. 63-85.
Carolyn Hildebrandt, "Structural-Developmental Research in Music: Conservation and Representation" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 pp. 84-85.
Robert G. Petzold, "Auditory Perception by Children" in **Journal of Research in Music Education**, 17/1 (Spring 1969) pp. 82-86.
Marilyn Pflederer-Zimmerman, "Music Development in Middle Childhood: A Summary of Selected Research Studies" in **Bulletin of the Council for Research in Music Education**, Winter 1986 pp. 23-26.
Karin Poppensieker, **Musikpädagogik - Forschung und Lehre, Band 23: Die Entwicklung musikalischer Wahrnehmungsfähigkeit**. Mainz: Schott, 1986 pp. 83-113.
Stephen Schellenberg and Randall S. Moore, "The Effect of Tonal-Rhythmic Context on Short-Term Memory of Rhythmic and Melodic Sequences" in **Bulletin of the Council for Research in Music Education**, 33/2 (Fall 1985) pp. 207-217.
Moog, Davidson, Shuter-Dyson and Gabriel as quoted by David J. Hargreaves, **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986.

Table 4.1 Synopsis of general trends recognized in the (musical) development of children aged 0-15

Years of age	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Sensory-motor intelligence: reacts to environment, delayed imitations, enacting of images	0–2
Musical 'babbling'; spontaneous songs consisting of brief repetitive phrases and vocal pitch glissandi; not based on discrete pitches	1–2
Reproduction of familiar song phrases	2–3
Perception of general melodic structure	3–4
Mastery: sensory and manipulative (delight in sounds, fascination with timbre and dynamic levels, pulse unsteady. After 3, "handling" of instruments, begin to organize pitch)	0–4
Decline of physical response to music; listening becomes more important	3–5
Discrimination of pitch register; matching of pitch contour; projection of key center although intervals are not always correct; tap response to simple rhythms; underlying pulse can be extracted from surface rhythms	4–5
Recognition of invariant melodic structures when (a) the rhythm is varied and (b) variation appears in more than one parameter	5–6
Use of written symbols to represent sound	5–6
Improved in-tune singing	6–7
Pre-operational intelligence: Use of symbols, e.g. language and mental images in a static way	2–7
Imitative thinking: personal and the vernacular (deliberate change of speed and dynamics. After 5, familiar melodies presented as own compositions)	3–8
Imitation abilities only mechanical and not an indication of understanding; Verbal tasks performed with eagerness; Tonal and atonal sequences diverge with children doing better in tonal sequences	6–10
Distinction between timbre and pitch in order to indicate slight melodic alterations	7–8
Graphic rhythm descriptions: iconic, counting meter and true figural drawings	7–8
Concrete operational intelligence: mental operations e.g. classification, understanding of spatial relationships, and ability of organization	7–11
Improved rhythmic performance tasks and graphic representations: fewer counting meter drawings and more higher level metric drawings; 11-12, mostly true figural and true metric	8–12
Improved melodic memory; recognition of invariant melodic structures when transposed; two-part melodies perceived; sense of cadence	9–10
Harmonic sense becomes more established	10–11
Increase in cognitive appreciation and in emotional response	11–12
Improved recognition of atonal sequences	12–13
Relationship between musical talent, ability to compose and visual-spatial ability; decline of the latter two after puberty	9–14
Imaginative play: speculation and the idiomatic (experimenting with new material in own compositions characterized by unexpected changes; Copy models and popular practices)	10–14
Formal operational intelligence: logical and abstract hypothetical reasoning, evaluation of own thoughts	12–15
Meta-cognition: symbolic and systematic (strong personal identification with music; reflection on music and communication in intellectual ways; element of theorizing in compositions)	15+

1.3 Musical thinking processes

Whereas the previous research results explained in an epistemological way what the expected level of development at a specific age is, it did not reveal the thinking processes involved in musical learning and/or listening. The latter is characterised by the use of theories and models that artificially try to simulate musical thinking processes.

Peter R. Webster developed a comprehensive model for musical creative thinking, incorporating the acts of composition, instrumental/vocal performance/improvisation and analysis (either in written, verbal or imaginative form). According to Webster, creation is involved in all these acts. To reach his goal of composition, performance, improvisation or analysis, the creator has to rely on so-called 'enabling skills' that allow for the thinking process to occur. These skills are *musical aptitudes* (tonal and rhythmic imagery, musical syntax and extensiveness, and originality nurtured by the environment), *conceptual understanding*, (single cognitive facts that embody musical understanding such as rhythmic, melodic, harmonic, and timbral concepts) *craftsmanship* (ability to apply factual knowledge to solve a complex musical problem), *aesthetic sensitivity* (shaping of sound structures to capture affective responses to music).

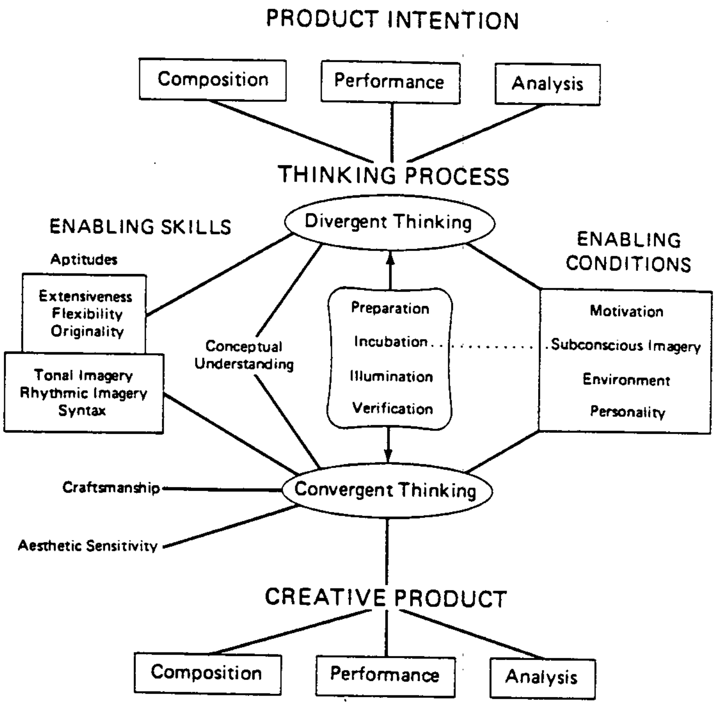
These 'enabling skills' are furthermore supported by 'enabling conditions' that vary from person to person. These conditions are *motivation* (external and internal drives), *subconscious imagery* (mental activity that may strengthen the creative process when the creator is occupied consciously with other activities), *environment* (financial support, family conditions, musical instruments, acoustics, media, social expectations) and *personality* (characteristics such as risk-taking, spontaneity, openness, perspicacity, humour).

In order to create a composition/performance/analysis, Webster furthermore distinguished between *divergent* (the generation of as many solutions as possible to a given problem) and *convergent* thinking (the 'weighting' of these possibilities and 'converging' on the best possible answer). In the first process imagination, which is influenced by the individual's conceptual understanding of the material itself, plays an important role. This is followed by a convergent filtering process in which the mind sifts through all the possibilities, 'creating' a final solution.

These two modes of thinking are directly related to the earlier mentioned 'enabling' skills and 'conditions'. Divergent thinking involves the aptitudes of extensiveness, flexibility and originality, whereas the aptitudes of tonal and rhythmic imagery and musical syntax, as well as craftsmanship and aesthetic sensitivity are clearly connected to convergent thinking. Both forms of thinking are involved in conceptual understanding.

There is a constant forward and backward movement between divergent and convergent thinking, which takes place in four stages: *preparation* (awareness of problem, e.g. first sketches of overall structure of composition), *incubation* (the often subconscious consideration of a number of musical solutions), *illumination* ('light bulb' stage where solutions are found) and *verification* (final refinements and additional subtleties, performance of studied piece, composition). Webster summarised his theory in the following diagram:

Fig. 4.2 Webster: Conceptual model of creative musical thinking



Although this model was not designed in developmental terms, Webster maintained that it could also be applied to the young child engaged in creative thinking. As long as the physical and intellectual development of the child is taken into account, instruction in all activities is not harmful. 'Enabling skills' and conceptual understanding, craftsmanship and aesthetic sensitivity develop with age and experience. Webster strongly emphasised the fact that children are not traditionally provided with the necessary environment to develop divergent and convergent thinking.[36]

This model of Webster is to a certain extent related to Warren F. Prince's paradigm for research on music listening (presented in Chapter Two) that dealt with all the possible variables of the listening process. Both Webster and Prince addressed musical aptitudinal and environmental influences such as memory (imaginative) abilities, motivation and general attentiveness of the hearer/creator. Prince furthermore addressed the aspects of short-term and long-term memory, concept development such as hearing patterns and elements, and insights into form and style. These are also related to Webster's conceptual understanding, craftsmanship and aesthetic sensitivity.[37]

Other theories emphasised the role of audiation (mental pitch and rhythm representation) as being fundamental to the understanding of music. Students should learn to audiate music that they are hearing, music that they have heard, and

36 Peter R. Webster, "Conceptual Bases for Creative Thinking in Music" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 pp. 162-167.

37 Warren F. Prince, "A Paradigm for Research on Music Listening" in **Journal of Research in Music Education**, 19 (1971) pp. 445-455.

music that they will hear.[38] Hildebrandt furthermore distinguished between *musical-logical* (discrimination and classification of pitches, durations, timbres, tonal and rhythmic progressions, themes and variation, and larger musical forms) and *musical-grammatical reasoning* (understanding of the form and meaning of music within given styles and traditions). The first enables the classification of musical excerpts as being the same or different, and the latter enables the recognition of certain changes as related to melodic variations within a given style of music, and it also enables the ability to anticipate the musical events which are likely to occur next. It was recommended that more attention should be given to this second form of musical-grammatical aspects of cognition, because the ability to organise musical sounds and derive structure and meaning from them is important for musical development.[39]

2. AN INTEGRATED AURAL TRAINING APPROACH FOR YOUNG INSTRUMENTALISTS/VOCALISTS

The need to equip young instrumentalists and potential musicians with the opportunity to develop their musical consciousness and aural comprehension was addressed by several authors, and was indirectly revealed in the research results of the questionnaire-based survey discussed in Chapter Three. The purpose of this section is to recommend an integrated approach to Aural Training through composition, taking into account music psychological aspects. The model of such an approach is first presented, followed by a few supportive examples from teaching practice.

It is necessary to point out that Bernita Douglas and Russell A. Kozerski addressed an integrated Aural Training approach to piano teaching and a compositional approach to general Music Education respectively.[40]

According to Douglas, the pieces that the children play should form the study material for aural instruction. She also included composition amongst other Aural Training methods such as conducting meter, the singing of prominent intervals and triads that appear in the piece, instrumental transposition, improvisation, dictation and sight singing.

The emphasis in the researcher's model is put on creative tasks. Whereas these tasks form only one of many methods in Douglas's integrative approach, it forms the *central* component in the researcher's approach around which other methods are organised. This does not mean that integration as recommended by Douglas should not take place, using the children's instrumental pieces that they are playing. In fact, the researcher strongly recommends, for example, the sight singing of new instrumental pieces, or the declamation of rhythmical patterns that appear in them.

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38 Edwin E. Gordon, **Learning Sequences in Music - Skill, Content, and Patterns.** Chicago, IL: G.I.A., 1988 p. 20.

39 Carolyn Hildebrandt, "Structural-Developmental Research in Music: Conservation and Representation" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987 pp. 91-92.

40 Bernita Douglas, **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig**. Unpublished Master's thesis, University of Stellenbosch 1990.
Russell A. Kozerski, **Personal Computer Microworlds for Music Composition and Education**. Doctoral dissertation, University of California, San Diego 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Kozerski developed the computer programmes *The Pitch Time Grid* and *Sound Globs* for teaching creative thinking as a way of becoming acquainted with musical concepts. In Kozerski's approach, the main emphasis, however, is placed on using the computer environment and not the instrumental instruction environment.

Unless compositional programmes are used under the guidance of a teacher, it is doubtful if children will develop beyond the intuitive creative level. This is not to dismiss the value of compositional programmes in general Music Education - it certainly is a valuable tool to introduce children to the mysteries of the compositional world. But that is all that it is, an introduction. The necessary refined craftsmanship and teacher-guided translation of sound into notation seldom takes place. The computer-student environment cannot fully explore all the didactical issues that arise in the same extensive way that they do in a teacher-pupil instrumental environment. It should also be pointed out that, because of financial reasons and often because of ignorance, most teachers and pupils do not use computer music programmes. The integrated approach also provides for the opportunity of cross-fertilization between creative tasks and instrumental instruction.

Furthermore, although Kozerski addressed the advantages of musical composition for children in a general Music Educational context, his programme was applied to college-level teaching. Some of his ideas, however, are useful and were incorporated into the researcher's model.

2.1 A model for an integrated approach

The researcher's presented model has its roots in the music psychological principles that crystallised from the earlier discussed *Gestalt* perception, developmental research results and theories, and models of creative thinking processes. These principles could be summarised as follows:

(a) Music is perceived as organised patterns.
(b) Isolated stimuli have no meaning and depth.
(c) Meaningful listening is only possible within a pitch-rhythm context.
(d) The ability to organise stimuli improves with learning. The perception of simple melodic structures was already observed in 3- to 4-year-old children.
(e) Teaching approaches should include both perceptual and structural tasks.
(f) Sound should precede symbol in music teaching. The use of written symbols to represent music was observed in 5- to 6-year-old children.
(g) Figural graphic representations of rhythm precede metric drawings.
(h) Mere imitation tasks are not an indication of musical understanding.
(i) Musical development is closely linked with age and music education. More detailed levels of perception are reached by older and musically educated children.
(j) The pre-adolescent is optimally equipped to learn.
(k) The 7-year-old child already possesses the intuitive creative ability to work with symbol systems on an elementary level.
(l) Significant relationships were found between visual-spatial abilities, musical aptitude and the ability to compose, which declined after puberty.
(m) Critical reasoning develops between 12 and 15 years of age and often hampers creativity. It was therefore recommended that critical reasoning should be introduced during pre-adolescence in order to avoid this decline of interest.
(n) Musical composition proved to be an indicator of musical development.
(o) Learning/thinking does not only depend on musical aptitude, but also on thinking processes such as divergent and convergent reasoning, musical-logical and musical-grammatical thinking processes, as well as developed memory abilities such as audiation, short-term and long-term memory. The need for the development of creative thinking abilities was also expressed.

In the light of the listed music psychological principles, it can be concluded that (a) children aged 7 to 11 are adequately equipped to deal with patterns in a pitch-rhythm context, implying both the incorporation of phrases as well as whole compositions into Aural Training, (b) children are increasingly able to present what was heard in figural and metric drawings after the age of 6 years, (c) Aural Training should be approached through dealing with wholes, but should at the same time attend to the development of more detailed aural concepts, (d) divergent, convergent, musical-logical and musical-grammatical thinking processes should be developed, (e) all pupils should be exposed to the development of creative abilities and thinking processes, and not just the obviously gifted, (f) auditive critical reasoning should be included from the beginning of instrumental instruction.

The model for Aural Training with children was constructed against the background of these conclusions, and is based entirely on the conviction that most effective learning takes place through active involvement and creation. Although Larry Gene Smithee found both a guided listening and a composition/performance approach to twentieth-century music to be effective on a tertiary level, observational evidence, however, suggested that through the manipulation of musical elements in creative processes, greater motivation which results in a greater growth in learning can be achieved.[41]

The researcher's model consists principally of teaching Aural Training through composition by incorporating creative tasks into instrumental instruction, starting from the very first lesson. This model also relies strongly on Gardner's observation that the 7-year-old child has gained enough of an intuitive familiarity with symbol systems to be able to work with them adequately on an elementary level. The developmental theory of Swanwick-Tillman based on the compositions of children of various ages, as well as the researcher's own experiences as a piano teacher, strengthens this observation.

It was argued that all the goals of Aural Training can be achieved through the teaching of composition. The long-term goal of Aural Training, which is the development of musical consciousness, can be successfully achieved through exploring, applying and correcting students' own creative concepts. The student becomes acquainted with the characteristics of all the individual parameters and their relationships to one another in a playful way, through trial and error. Not only does the compositional process provide for the opportunity to develop macroscopic and microscopic structural hearing, musical-logical and musical-grammatical, divergent and convergent thinking, but it also presents a complex musical context in which sounds are organised. Overall structural and stylistic aspects are addressed while attention is also paid to perceptual details.

Critical reasoning forms an important ingredient of musical understanding. What is regarded as the highest level of cognitive thinking can be carefully applied from the very first compositional endeavours. Through this, children learn to practise a healthy form of self-criticism and learn to appreciate the works of other composers.

The teaching of composition also provides the teacher with the chance to teach students what Barry Green and W. Timothy Gallwey called 'the inner game of music'. They distinguished between the 'outer game' (e.g. proper hand position, breath support, bowing techniques, 'the only right way to play Brahms') and the inner game which is, to a

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41 Larry Gene Smithee, "The Effects of Two Methods of Teaching Basic Concepts utilizing Twentieth-Century Music" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1975-A - 1976-A.

certain extent, the key to success in the larger game of life. In the inner game the obstacles are mental, such as lapses of concentration, nervousness and self-doubt. The authors pointed out that *awareness* (simple awareness of what is happening before the 'rush to judgment' takes place), *will* (the direction and intensity of attention) and *trust* (trust to allow simple awareness to take place without "'bombarding' the self with criticisms and judgment", trust to explore the trial-and-error approach) are the three skills to be developed through this 'game'.[42]

Through composition, the rudimentary goal of perception of the most basic sensorial everyday and musical impulses, as well as all other secondary goals, such as the development of musical memory, inner hearing, creative skills and the ability to evaluate, can be achieved. Affective listening (attentiveness, will, concentration) and psychomotor skills (the actual playing of the piece on an instrument) are also incorporated. All the goals of Aural Training can thus be achieved through this comprehensive teaching approach.

Due to the learning of theoretical principles, reading skills, correct posture, eye-hand co-ordination, coordination between the two hands (and feet in the case of organ playing), the instrumental beginner is always limited to the use of a certain register, note values and pitches for at least one year. In the case of keyboard instruments, single melodic lines with very simple chords often form the study material. Because of their technical inadequacies and lack of reading abilities, children often become frustrated because, creatively speaking, they are on a higher level of musical thinking than the level of their technical abilities. They are used to listening to much more complex music than they are playing. Many music teachers experience a decline of interest in the pupil in learning to play an instrument after the first three months. Apart from other possible reasons such as level of musical aptitude, family problems, lack of discipline to practise, motivation on the part of the teacher and parents, the researcher is strongly convinced that this decline is mainly related to the necessary and very important "dry phase" of becoming acquainted with the rudimentary aspects of playing an instrument.

This phase can, however, be bridged by giving the child the opportunity to use his whole instrument, different registers, note values, playing techniques and sound possibilities to create more complex music. As mentioned before, through this *all* parameters of music can be explored in a trial and error approach. During the composition part of the instrumental lesson, which does not take up more than ten minutes, the pupil should be allowed to use "wrong" playing techniques. The purpose is to develop musical consciousness and not correct posture. The latter is corrected in the other parts of the lesson and will gradually make its way into the playing of pupils' own compositions.

The teaching of composition as a way of developing musical consciousness also provides for a comprehensive approach to the teaching of music theory principles. Written skills serve the purpose of expressing musical thoughts, and lose their often, in the eyes of children and teachers, tediousness regarding repetitive drawing of clefs, note values, transposition exercises and other drills. In order to help children to move beyond the level of intuitive, improvisatory creation, a very important educational facet of the teaching of composition is the notation of pupils' own compositions in either graphical or traditional notation. Through this activity, mental images have to be translated into symbols, an activity which does not only require a knowledge of the structure of the building blocks

42 Barry Green and W. Timothy Gallwey, **The Inner Game of Music.** New York: Achor Press, 1986 pp. 11 and 28.

(e.g. intervals, chords) or form of the piece (e.g. repetitions, sequences), but also a knowledge of written theory principles. It is a form of complex dictation, dealing with musical wholes.

The compositional process consists of two main stages. During the first stage the pupil has to create a piece of music on his instrument, and during the second stage the final product should be notated. The pace at which a work is completed depends on the child and the complexity/length of the composition. The first stage normally takes one to three weeks (three instrumental lessons), whereas the second stage involves a longer time period in which four to eight bars are notated per week. If the material is very repetitive, more bars can be completed per week. Depending on the length and complexity of a composition, another three to four weeks are needed to complete the score. This leads to the completion of one composition every two months, and five to six compositions per year.

During the first stage, that of creation, the child has to translate mental images into sound symbols. It is thus not crucial if the child unconsciously uses other compositions or songs as reference points. These ideas still need to be translated into sound, requiring an analysis of exact intervals and harmonies. The translation of rhythm, however, still remains on a more or less intuitive level.

During the beginning stages of the application of composition techniques, children can be asked to create sound stories, using whatever musical elements they feel to use. Unorthodox playing techniques such as tapping on the piano or violin body, the vocal production of sound, either in the form of noises or melodic structures, tapping on the floor using their feet, serve the purpose of exploring the sound capabilities of their own instrument, body and environment. Through these activities the rudimentary goal of perception of the most basic sensorial everyday and musical impulses can be achieved. By combining sounds with a story, children learn to organise sounds in patterns, attending to the goals of macroscopical listening/thinking.

During the creation process different compositional techniques such as contrast, repetition, augmentation, diminution and sequencing should be introduced according to the child's level of development. The teacher should continuously ask questions on various aspects of the composition, trying to find out whether the composition meets the pupil's expectations or not. If not, reasons for the dissatisfaction can be sought. While the construction process is part of the teaching process and not a measurement of the pupil's abilities, certain appropriate compositional archetypes and clichés, e.g. a cadence, can be demonstrated by the teacher. As a rule, children sponge up this information because of its direct application to the musical practice. Care should, however, be taken not to spoon-feed the child, but to lead him to find different solutions for a problem and finally to select only one. In order to foster original thinking, the pupil should be allowed to always make the final decision, even when this decision is not the best in the eyes of the teacher. When the composition closely resembles a well-known composition, the child could listen to this music and compare it to his creation, trying to spot the differences. During this phase both divergent and convergent thinking processes take place while the child consciously attends to microscopical listening/thinking.

As the child grows musically and becomes more and more proficient on his instrument, more complex and/or multi-instrumental/vocal compositions can be produced. It is also important to encourage the child to experiment with composing pieces for other instruments than his own. "Guided" composition, in which the basic "roster" is given by the teacher (e.g. use a D major scale, chords and one accidental that does not belong to the key of D major) should be included for learning to consciously apply specific musical elements. This form of guided composition should, however, be replaced regularly by a student's composition based fully on his own ideas and concepts. Such compositions can provide the teacher with an overview of the student's level of musical understanding. Further assignments should be adapted to this level, which sometimes prove to be on a higher level than the guided compositions.

The second stage of composition is entered when the pupil and teacher more or less agree on the final product, and when the composition is notated by the child. Figural rhythm and metric drawings can serve as pre-stages to traditional notation. In the case of the older beginner, these phases could be followed by translating the graphical images into traditional notation.

The translating stage in the compositional process is, from a pedagogical point of view, even more important than the creation process. Analytical thinking and encoding form the main components of the mental processes involved. A reevaluation of the piece also takes place during this stage and corresponds to Webster's verification stage.

In order to help children to encode the musical information, other methods such as conducting, singing, tapping, interval and chord singing can and should be included. Scores of other composers can be studied in order to examine their solutions to problems and score layouts. The translating process offers the unique opportunity of incorporating as many other Aural Training methods as possible. When treated comprehensively, these methods can open a whole new musical world to the child.

The underlying pulse should for example be determined through conducting, and the very important differences between for example 3/4 and 6/8 time can be thoroughly discussed and demonstrated. The pupil can be asked to play his composition in various meters while listening closely to their effects. In the case of beginners, the teacher can play the pupil's composition in various meters, asking the child to describe the differences. Through this the attributes of music and their effects on other parameters are explored. Knowledge gained in this way will inevitably enhance instrumental playing. The teacher can consciously refer to pupil's compositions when they play other pieces, for example in the following hypothetical situation: "Remember how much time you spent to choose the right meter? I once played it in a different way than you wrote it, and you did not like it. Mr. Beethoven went through the same difficulties and he would also like you to play exactly what he wrote. So let us try and play the 6/8 as a real 6/8 and not as 3/4".

Children often use complex rhythmic patterns which they have not had the opportunity to get to know in their instrumental instruction. In such cases the teacher should help the child in the encoding process, but at the same time use the opportunity of teaching more complex rhythm patterns by developing rhythm reading exercises. The same can be done with harmonic progressions and melodies. Because all exercises are related to the child's own composition, they never become purposes in themselves and always lead to a better developed musical understanding of the relationship between detail and wholes.

The characteristics of prominent intervals can be discussed, followed by singing exercises of these intervals. Transposition can be introduced by using phrases such as "I wonder how your composition would sound if we start on D instead of C". More complex compositions can be introduced by experimenting with, for example, "sing and play". In compositions where a melodic line is accompanied by chords or broken chords, the teacher could "wonder" how it would sound if the melody is sung by the pupil while the accompaniment is played. After this, it could be suggested that the pupil tries to compose a piece for voice and piano/flute/violin, etc.

Questions such as "are you satisfied with the tempo?", "at what dynamic level would you like the piece to start?", can stimulate thinking about other parameters than those included in the composition. Music terminology regarding the character of a piece and its dynamic levels can thus also be learned in the process.

During the beginning phases of the compositional process, pupils may be allowed to write down their finished products at their instrument, trying intervals and chords out before notating them. As soon as their written skills and inner hearing abilities are on a higher level, however, they should be encouraged to do the written part away from their instrument, in order to develop their mental music imagination abilities. The method of error detection can be applied when the pupil aurally compares his written version with the actual composition.

This model has the advantage that it can be applied to all levels of musical development. Tertiary music students who would have had the opportunity to develop their musical consciousness from their first instrumental lesson through the application of this model, will be able to further mature as musicians on an advanced level. The emphasis so often placed on writing cadences in harmony classes could be replaced by the application of more advanced composition techniques. Through this approach pupils and students will learn to be able to understand musical structures as well as details. They will be musicians and not mere technical music producers who are unable to make music when sheet music is not available. Making mistakes when performing will not be a catastrophe but an opportunity to improvise around the mistake in such a way that makes musical sense.

2.2 Examples from teaching practice

The described model was applied to the researcher's own piano students who were within the age group of 8 to 13 years. Five compositions from four different pupils are presented in order to show that such a model can indeed be applied as a way of teaching Aural Training.

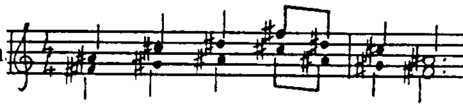
The first composition to be discussed, was created by Rebekka. Rebekka is 8 years old and a very lively, intelligent and above average musically talented child. At the end to her very first piano lesson, which consisted of the standard introduction to the piano, showing her the "insides" of the piano and the way that sound is created, posture, finding all the Cs on the piano and playing two songs from her new book, the researcher asked her to create a sound story for the next lesson. This is what she came up with:

Fig. 4.3 Researcher's translation and encoding of *The Chinese girl* by Rebekka

The Chinese girl

Once upon a time there was a little Chinese girl  who lived

in a small town in which many things happened 

One day, the king visited the town because he was looking for a wife for his son 

He chose the little Chinese girl  and they [the

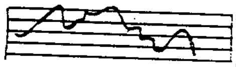
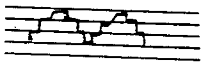
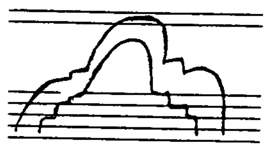
married couple] lived happily ever after 

It is clear from this composition that Rebekka already possesses the ability of pattern thinking and application of musical form and style. The same theme was used twice for the little Chinese girl, the activity in the town was portrayed in the second interval movement, and a pentatonic scale was used as basis. Her sense of character was revealed in the meter changes. A 3/4 was chosen to portray the naive character of the Chinese girl, and the little town. When the king arrived, she intuitively chose a more pompous two-voice 4/4 meter. Married life was portrayed in an almost contrapuntal two-part section which had the swing of the 3/4 meter but, in a more complicated way. What a high level of intuitive creative thinking!

The next phase consisted of producing a graphical score of the composition. The end product was as follows.

Fig. 4.4 *Chinesenmädchen* by Rebekka

Chinesenmädchen.

Es war einmal ein kleines
Chinesenmädchen . Es wohnte
in einem Dorf, und da war immer
sehr viel los. . Eines Tages kam
ein chinesischer König in dieses Dorf.
Der König wollte ein passendes Mädchen
für seinen Sohn finden .
Und er nahm das kleine chinesische
Mädchen . Und sie lebten glücklich
und zufrieden für immer und ewig

.

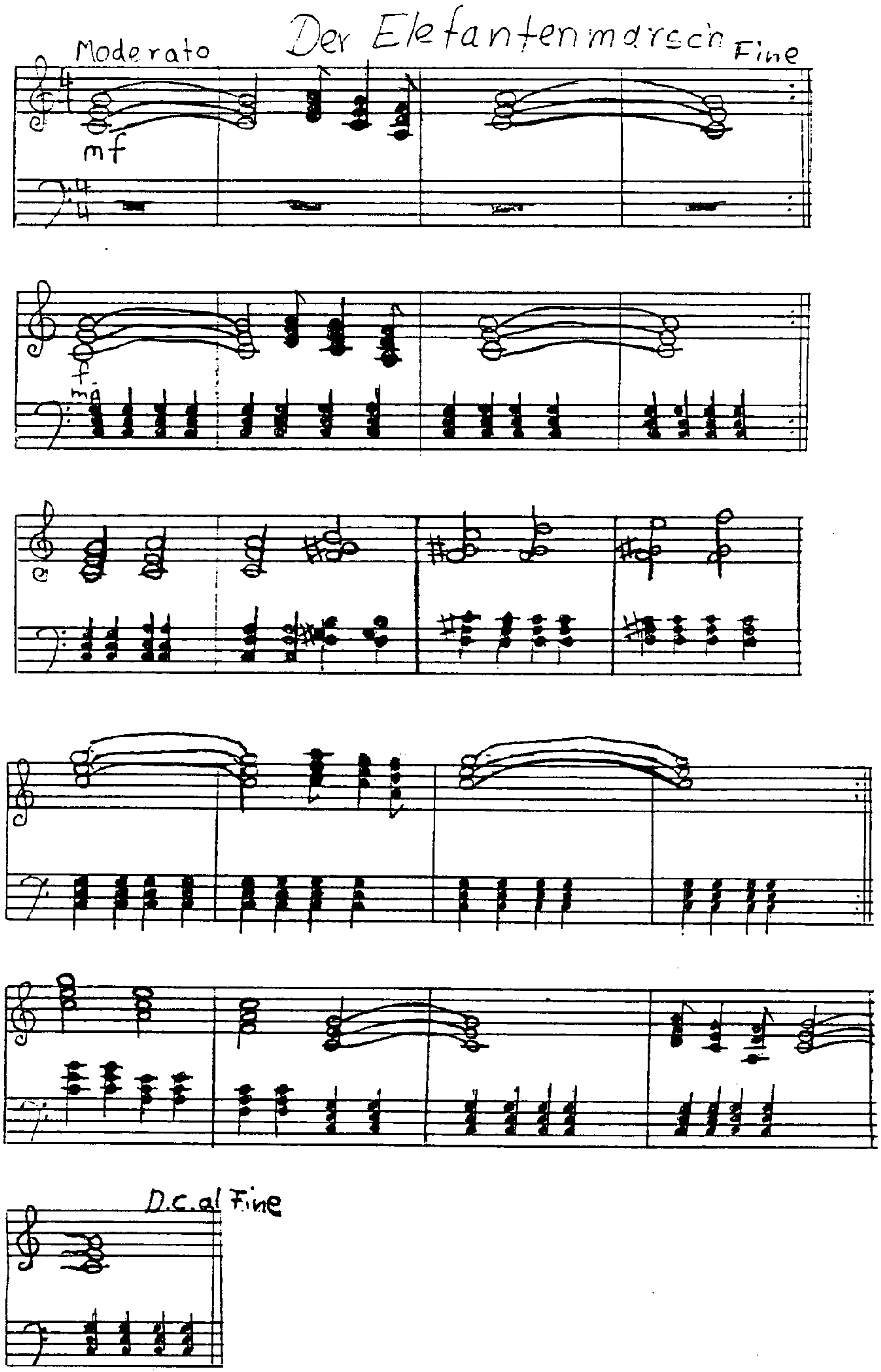
The second and third compositions were created by Rebekka's sister, Elisabeth. Elisabeth is 11 years old and an introvert. She is no less intelligent or musical than her sister, and her whole approach to music is very introspective which often results in her being dissatisfied with her own compositional attempts. As she developed musically and technically, her dissatisfaction started to decrease. Elisabeth first attempted to compose after her first piano lesson when she was 10 years old. There was a time delay of one month between her creating the piece, and the translation process into traditional notation because the necessary written skills first had to be introduced:

Fig. 4.5 *Chao Chai* by Elisabeth

The composition *Chao Chai* is almost a direct copy of a "no-name" piece that all pianists play at some time or another during their beginning stages. Although Elisabeth was 10 at the time when she composed this piece, her development complies with Swanwick-Tillman's *vernacular stage of development* between age 4 to 9. Knocking on the piano was however a "new" idea added to this composition. A very clear ABA form was decided upon, indicating an established sense of musical form. If the creation process was pedagogically speaking not that interesting, the translation process indeed served as a powerful teaching tool. The notation of the left hand did not provide any difficulties. Through this process Elisabeth became acquainted with the use of more than one ledger line, something which is only introduced at a much later stage of instrumental instruction. Because sixteenth notes were not yet introduced in her instrumental instruction, this had to be explained. The researcher clapped the beat and Elisabeth the rhythm. She was asked to listen carefully when the "right hand" rhythm started. Her answer was between two and three! (One of the researcher's adult Aural Training students could not hear this.) The next question was if it was closer to the two than to the three. Elisabeth of course came up with the correct answer. This process of careful listening was followed by the researcher demonstrating how this rhythm could be encoded in traditional notation. Transposition exercises of the bass melody had to be played and sung, and a rhythmic exercise which contained the dotted rhythm pattern with and without rests had to be clapped.

After composing several other pieces, the composition presented in Fig. 4.6 was created about six months later. Elisabeth's musical growth can be clearly seen. In her piano instruction, the I-IV-V harmonic progression was introduced, using these chords to harmonise folk-songs that she had learnt in school music classes. The researcher also gave her the assignment to compose a piece which consists mainly of chords, expecting it to consist merely of these primary chords. What a delightful surprise the complex chord progression that appears in bars 9-12 provided! Elisabeth has only recently finished notating her piece. During the next phase the researcher will expect her to transpose this chord progression to one or two other keys. Special exercises in which the diminished chord should be recognised and sung will also be designed. She will also be introduced to examples from the music literature in which pedal point chord progressions were used.

Fig. 4.6 *Der Elefantenmarsch* by Elisabeth



The third pupil to be introduced is Melanie. Melanie is 12 years old and technically speaking, moderately talented. About three years ago she took piano lessons from someone else for about one year and did not receive any instruction for two years, playing on a very small Casio electronic keyboard until her parents finally bought a real acoustic piano. She has obvious problems coordinating her right and left hand, and especially finds even the easiest contrapuntal pieces difficult. It was only when she completed the following composition that the researcher realised that she is a very creative person.

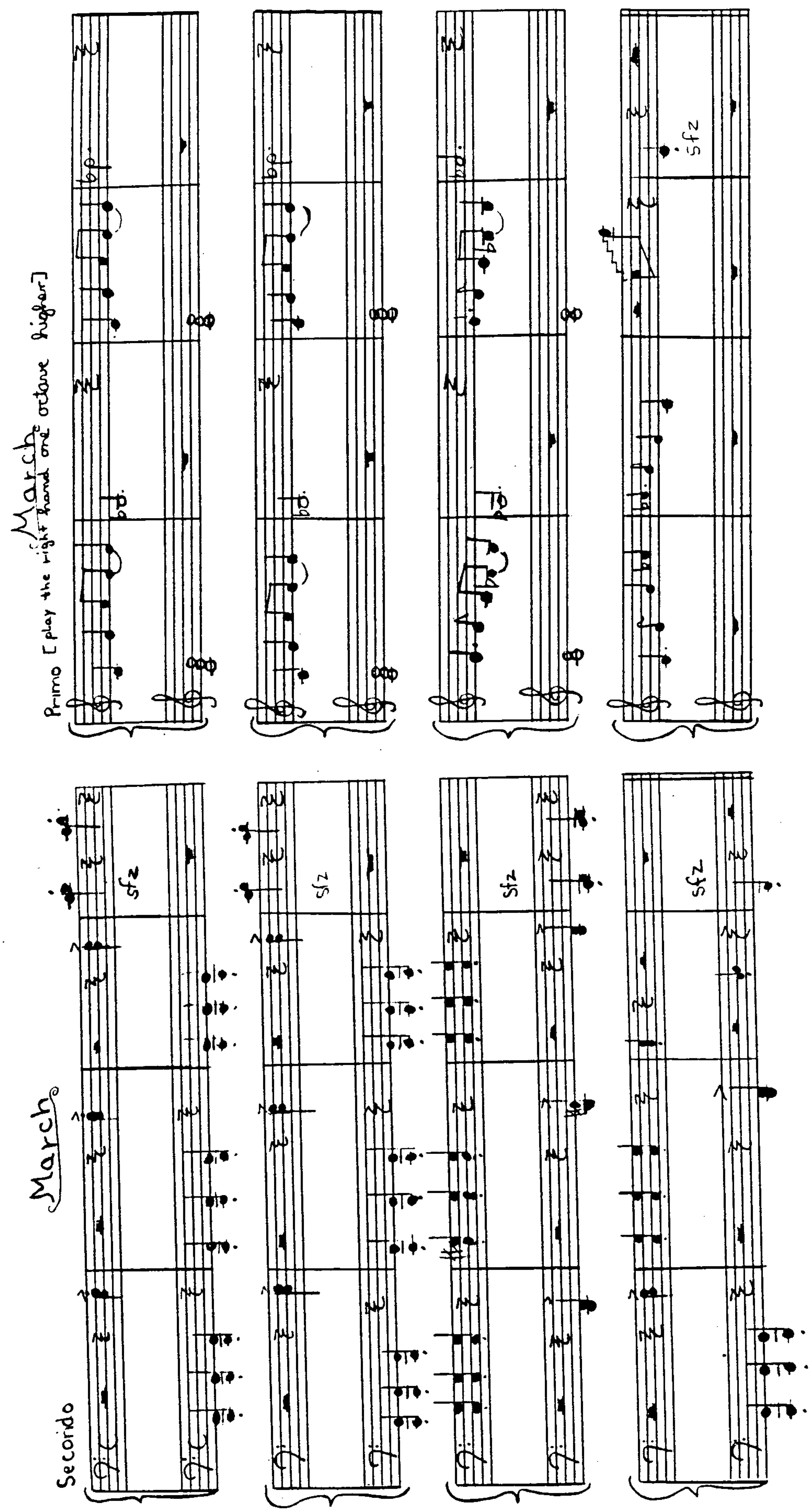
Fig. 4.7 *Geisterstunde* by Melanie

Melanie decided to write programme music, portraying a graveyard where the ghosts start to dance when the clock strikes twelve. The old ghosts start to dance first, followed by the younger ghosts. All dance together in a third section. The clock strikes one and the party is over! This composition is an interesting potpourri of instruction material, familiar songs and her own ideas. The *Big Ben* theme was taught to her during her early piano lessons. During the encoding process, however, Melanie did not copy this from her piano book, but wrote it down from memory as a form of dictation. The encoding of the twelve tolls of the clock led to an interesting discussion. Three beats were too long for each stroke, and one too short, so Melanie decided on two, using ties. The determination of the meter changes required very careful listening and experimentations, playing the piece in various meters. Transposition, rhythmic and singing exercises, based on the composition, were also included.

The last composition was created by Christopher who is 13 years old. He started taking piano lessons from the researcher two years ago. Christopher is talented but impatient and lazy. His critical thinking and fine ear often hamper not only his compositional activities, but also his playing abilities. First compositional attempts included composing single melody lines and variations of accompanied folk-songs. Christopher found the original idea for the composition below when his class visited the island Sylt in the North of Germany. The composition was initially started with the idea of creating programme music. Because of its complexity, Christopher decided that two players should play it. The initial idea was that the secondo player would portray the motor of a ship indicated by repetitive chords, whereas the primo player should then portray the sea waves through playing a glissando-like melody. When the secondo part was finished, however, Christopher departed from his original idea of creating programme music and wrote a melody to fit the secondo part, calling the composition *March*.

This Prokofiev-like March with some parts of the melody based on a whole-tone scale was ninety-five percent the product of Christopher's own ideas. The principles of inversion of the material was consciously applied as can be clearly seen in the secondo part of the piece, and to a certain extent in the primo part as well. In the finishing line of the secondo part motives were combined, and the intervals of a third, second and prime that appear in the last two bars as a way of wrapping up the musical material, was an explicit wish of Christopher's. When the primo part was finished, it was found the original planned chords in bar ten did not quite fit, and Christopher adjusted them according to the melody by adding a G sharp and by changing the C into a D. The primo part with its accidentals was primarily the product of Christopher's attempts to construct a melody and the researcher's main function was to play the secondo part and ask questions to stimulate the creation process. In the encoding process, as with the other children, the meter of both parts was determined through clapping, conducting and trying out different meter possibilities. The diminished interval had to be sung, the melody transposed, and the secondo part played while the melody was sung.

Fig. 4.8 *March* by Christopher



It can be clearly seen from all these examples that all four children were fully capable of not only creating their own compositions but also encoding them in either graphical or traditional notation. All of them were motivated and the initial 'But I don't know how' quickly changed into complete devotion to their tasks. All of these children practised divergent and convergent, musical-logical and musical-grammatical, and macroscopical and microscopical thinking. As they grew musically, their critical reasoning abilities also developed.

It is also interesting to note that all of these children are from either German-Indian, German-Philippine or German-American families. Although all of them attend German schools, they come from various cultural backgrounds. There was, apart from aptitudinal differences, however, no difference in their abilities to immerse themselves in creative tasks. It can thus be concluded that children from various cultures are capable of applying creative tasks as a way of developing their musical consciousness, an observation which corresponds with the research results of Gardner and Swanwick-Tillman. The model for applying composition as a tool of teaching musical thinking offers boundless advantages and opportunities to incorporate all the ideas of a creative music teacher.

* * *

CHAPTER FIVE

Summary

The number of articles published and conferences held on Aural Training since the 1980s has revealed an increasing sense of awareness of the importance of this subject. This positive tendency could be clearly seen in the overview and list of other investigations presented in the first chapter and in Appendix A.

As research endeavours as a rule emphasised isolated facets of the discipline often reflected in selected didactical approaches, music psychological issues and phenomena such as perfect pitch, tone deafness and chromesthesia, there was also a need to examine the Aural Training domain in a broader sense, taking into account all its different aspects. It was only when the investigation of the objectives, teaching philosophies, contents and methods of this subject was completed that problem areas were identified and meaningful recommendations for curriculum changes and teaching approaches could be made.

The purpose of this research endeavour therefore was to develop an understanding of the general state of Aural Training as presented at a tertiary level. Based on this outline, recommendations for a theory towards Aural Training were furthermore made.

1. SUMMARY

The investigation consisted of three main parts. The first two parts complemented each other in that both theoretical and practical aspects of Aural Training were examined. An in-depth study on the didactical aspects of Aural Training as found in published and unpublished sources formed the essence of the first part. The extent to which these aspects were reflected in the tertiary aural curricula of three countries was examined in the second part. A model of aural instruction for young instrumentalists was presented in the third part.

The areas covered by the theoretical survey were the rationale behind Aural Training, teaching ideologies, contents and target group, and methodological approaches. From this survey the following theoretical picture of various aspects of Aural Training was formed.

Most authors of Aural Training textbooks and workbooks referred very vaguely to the rationale behind their teaching approaches. Astonishingly enough, most information found on the objectives, teaching ideologies, contents and target group stemmed from sources other than Aural Training text- and workbooks.

Two different viewpoints on the significance of Aural Training were found. For one group of authors, the importance of this subject merely lay in the applicability of its skills to other subjects. They mainly emphasised the supportive role that Aural Training plays. The second viewpoint was presented by a minority of authors who tried to see the relevance of Aural Training not simply in its application to other subjects, but mainly in its ability to develop mentally musical thinking abilities. According to them, Aural Training enables the student to perceive and think in the characteristic categories of music.

A complete hierarchical structure of objectives primarily designed for Aural Training purposes could not be located. The long-term goals found in various publications were therefore organised in such a hierarchy by the researcher. Bloom's taxonomy of educational objectives, Prince's paradigm of the listening process, as well as Lehr's derivations of aural objectives from the characteristics of the listening process, formed the background against which this hierarchy was constructed. In the hierarchy, the first preeminent long-term goal of Aural Training is to develop perception of the most basic sensorial everyday and musical impulses. Through developing attentiveness, macroscopical structural listening, memory, inner hearing, practice-based skills to support other subjects, microscopic structural listening, creation and evaluation, the primary long-term goal of Aural Training can be reached. This process was illustrated by a pyramid diagram in which the potential musician/listener is presented at the one end, and the "ideal" listener at the other end. This "ideal" listener with a developed musical consciousness will be able to recognise broad overview formal characteristics and details of a work. He will also have the ability to translate symbol to sound, and sound to symbol as a form of mental imagination. Through the application of cognitive strategies such as problem-solving, and the conscious use of musical concepts, he will be able to act passively and actively on what was heard, being furthermore able to exercise creative and evaluative reasoning.

The teaching environment in which these goals are to be achieved is strongly influenced by the teaching philosophy of the teacher. As a result of the influence of the Behaviourist and Cognitive schools of psychological thinking, four different teaching philosophies were determined: *Isolation vs Integration and Comprehension*, and *Fragmentation vs Holism*. Combinations of these philosophies often resulted in isolated fragmented approaches vs integrated, comprehensive holistic approaches.

Most of the text- and workbooks examined followed a fragmented approach, dealing mainly with isolated musical parameters outside of a musical context. The holistic approach, on the other hand, concentrates on dealing with musical entities within musical contexts. In combination with a comprehensive approach, cross-references are made to other music disciplines in order to understand music. Aspects of other subjects are not only included in Aural Training classes, but Aural Training is also integrated into, for example, Music Theory, Analysis and Instrumental/vocal performance classes. In the isolated approach, on the contrary, compartmentalised thinking holds sway. Each subject is treated in isolation, with little or no reference made to its relationships to other subjects, or to its relations to active involvement in making music.

As a result of isolated fragmented approaches, dictation exercises seldom exceed the length of a phrase, include merely pitch-time parameters performed on the piano, and are limited to eighteenth- and nineteenth- century practices. The contents of Aural Training from a comprehensive point of view include, on the contrary, examples from the music literature from all style periods, incorporate all the parameters of music and use a wide variety of methods to develop aural consciousness.

Whereas some authors suggested that perfect pitch possessors should be excluded from, or only be partially included in, Aural Training classes, a few authors emphasised the fact that both relative and perfect pitch hearers should receive extensive instruction in all aspects of Aural Training. What is important is not a superficial approach with its sole goal the naming of note names, but a deeper penetration into the creation process of reproduction as opposed to mere imitation.

A distinction was made between classroom-based and programmed instruction. These two forms of instruction basically apply the same teaching methods but in different environments. They should therefore not be seen as opposites, but as different manifestations of teaching which are meant to complement each other.

Thirteen different methods were distinguished in the classroom-based instruction category, and were discussed from a historical point of view. Research results stemming from investigations other than that of the researcher were also discussed.

1. Gestural tasks
   (a) Indication of pitch
   (b) Indication of rhythm and meter/beat
   (c) Indication of combined music parameters

2. Reproduction tasks
   (a) Vocal
   (b) Instrumental

3. Recognition tasks
   (a) Scales
   (b) Intervals
   (c) Chords
   (d) Clichés
   (e) Timbre

4. Imagination tasks

5. Reading tasks
   (a) Score reading
   (b) Rhythm reading
   (c) Sight singing

6. Transcription tasks
   (a) Traditional notation
   (b) Other stave systems
   (c) Non-traditional notation

7. Transposition tasks

8. Completion tasks

9. Discrepancy tasks
   (a) Aligning notation and sound
   (b) Error detection
   (c) Comparisons between score and different recordings

10 Description tasks

11. Aural analysis tasks

12. Creative tasks

13. Evaluation tasks

The field of programmed instruction was furthermore divided into non-computer (NCAT) and computer-assisted Aural Training (CAT). These two manifestations of programmed instruction can also be seen as developmental stages of self-instruction, with NCAT a forerunner of CAT. The advantages of programmed instruction are that students can work at their own pace, timbres other than the piano can be included, constant records of the students' progress are kept, and students are working in an infinitely patient environment.

The main purpose of both CAT and NCAT is to provide the student with additional practice possibilities outside the classroom. Programmers argued that valuable classroom instruction time can be saved if students can learn basic skills or do remedial work outside the classroom.

NCAT mainly consists of aural exercises on cassette, with or without an accompanying workbook. CAT, however, offers a broader spectrum of advantages over NCAT. Whereas students applying NCAT are responsible for correcting their own answers after having completed a whole series of exercises, immediate feedback on errors is provided by CAT. By means of branching techniques, individualised paths of instruction are presented for each student.

Research results of investigations by other researchers revealed that:

(a) most programmed instruction was effective;
(b) programmed instruction was found superior to more traditional homework assignments;
(c) CAT was proved to be significantly better than NCAT;
(d) students' attitudes differed towards programmed instruction. Some students indicated that the presentation of isolated musical elements, poor sound quality, a discouraging grading system, system software bugs and the lack of 'on-line' guidance discouraged them to make use of this instruction form.
(e) the integration of the computer into curricula was hindered by the reluctance on the part of many teachers to review their goals, and their hesitancy to relinquish their position of authority.

Although forerunners of programs based on the Cognitive school of psychological thinking can be observed in software designed for composition purposes, many aspects of programmed teaching are still dominated by the Behaviourist learning theory. As a result of this theory, drill and repetition until the correct response is given form the core of most of the Aural Training software. This can be clearly seen in the list of more than hundred commercially available software packages presented in Appendix E.

The majority of programmed instruction packages is based on passive Aural Training. Newer CAT trends, however, enable Sight singing and keyboard and other instrumental reproduction tasks. Only a few NCAT and CAT programs addressed contextual Aural Training. Commercially available programs in which macroscopical aural analysis methods are included are almost non-existent. The use of Compact disc plus Graphics (CD + G) has not been applied to commercially available Aural Training software.

In the practical part of the survey, 300 questionnaires were in total sent to Aural Training lectures in the Republic of South Africa (RSA), the Federal Republic of Germany (FRG) and the United States of America (USA). The primary goal of this questionnaire-based survey was to describe the general state of Aural Training in the three countries. The secondary goals were (a) to compare aspects of Aural Training as represented in the three countries, and (b) , amongst other things, to examine the validity of the following practical hypotheses:

(a) Aural Training is looked upon as a subject that merely supports other subjects.
(b) Aural Training is treated as a separate subject in curricula of tertiary institutions.
(c) The teaching time available for Aural Training is not sufficient.
(d) More emphasis is placed on Sight Singing and Dictation than on other teaching methods.

(e) Aural Training is taught only in the smaller context of musical phrases and little attention is given to an overall structural approach.
(f) Computer-assisted instruction is not included in the majority of Aural Training curricula.
(g) In cases where computer-assisted Aural Training has been applied, the achievements of students have improved noticeably.

The results indicated that lecturers of Aural Training in the RSA saw Aural Training as a subject that merely supports other subjects. However, only a marginal majority of the lecturers in the other two countries indicated that they looked upon Aural Training as a subject with its own goals. These goals were the development of structural hearing, inner hearing, hearing strategies/hearing patterns, musical understanding, musical perception, musical literacy, and practical skills.

A possible reason for the lack of conformity on the primary goal of Aural Training was related to the inadequate training of many Aural Training teachers. Because of this, teaching objectives are not clearly defined, resulting further in negative attitudes towards the subject on the part of students, administrators and lecturers. An unfortunate side-effect of this situation is that primary and secondary teachers do not consciously develop children's and young musicians' aural/mental cognition. Many lecturers and authors pointed out that students enrolling at tertiary music institutions were not at all prepared for advanced Aural Training courses.

Aural Training was treated as a separate subject in all three countries. Although it was scheduled in separate classes, in grading policies it often formed a subminimum of 10%-50% of another subject. Diverse time schedules were followed at the individual music departments in all three countries. Only a marginal majority of lecturers from both the RSA and FRG indicated 60 minutes instruction time per week per student. USA lecturers indicated 120 to 180 minutes per week. The time available was influenced by the seniority of the students, developmental level, major subject of the student, and the availability of extra non-mandatory classes such as, for example, Aural Analysis. The duration of Aural Training courses as a rule was 4 to 6 semesters. Although most aural instruction took place as group tuition, lecturers from all three countries preferred a mixture of both individual and group tuition.

In both the RSA and FRG very small minorities of respondents indicated that they were satisfied with the available instruction time. Lecturers from the USA, however, clearly indicated their dissatisfaction, a fact which could be related to a growing consciousness of the importance of Aural Training.

More emphasis was indeed placed on Sight Singing and Dictation than on other teaching methods. Creative and holistic approaches such as conducting using free gestures, graphic representations, verbal descriptions using self-developed terminology, imagination tasks, aural analysis, improvisation and composition received little attention. Further information gathered on structural hearing indicated that little attention was given to an overall structural approach in all three countries.

Music mainly from the Baroque, Classic and Romantic style periods was used as teaching material. The majority of the lecturers from the RSA and FRG indicated that they also used a few self-composed exercises, whereas the majority of the USA lecturers indicated that they mainly used self-composed material with a few examples from the music repertoire. Most of the work-/textbooks indicated concentrated on isolated and fragmented approaches to Aural Training.

Reasons for the overall tendency to concentrate on isolated drill and practice could be that they provide the teacher with means to evaluate the state of the musical mind, that these exercises are readily quantifiable, need less preparation time and fit into a limited time schedule.

Programmed instruction (both CAT and NCAT) served the sole purpose of homework assignments in all three countries. Some music departments furthermore provided students with the opportunity of additional outside practice with a teaching assistant.

Regarding NCAT, RSA lecturers used commercially available programs, and FRG and USA lecturers made use of self-developed cassettes. Both NCAT and CAT were used for drill and practice in isolated musical parameters and dictation. Only a few lecturers indicated that they used NCAT for more comprehensive approaches such as completion tasks, aural analysis and comparisons of different interpretations of the same work.

The largest differences between the three countries could be seen in the field of CAT. A very large majority of the FRG lecturers did not include CAT in their curriculum, whereas a moderate RSA and fairly large USA majority of lecturers did include this form of programmed instruction. The main reasons for excluding CAT were a lack of knowledge about the available software, uneasiness about the synthesized sounds used, the complex technical environment involved, the limitations of programs, and the financial commitment attached to using CAT.

A large majority of lecturers from all three countries, however, revealed an interest in becoming better acquainted with CAT, and wished for programs in which they can include their own examples from the music literature. Other demands were software for sight singing purposes, completion tasks, aural analysis and the possibility of manipulating music on CD for Aural Training purposes.

Mainly drill and practice software were indicated by the majority of lecturers in all three countries. Reasons for their choices were that it was available, they were familiar with it, and that it was the best ('least worst'). Although indicated by a small minority, most of the self-developed programs stemmed from the USA. Two German lecturers developed their own software. No RSA developed software was indicated. The main reason for developing software was that the lecturers were not satisfied with the commercially available software.

Aural Training lecturers also indicated that they were interested in the application of music psychological aspects to Aural Training, more/other aspects of CAT, more detailed investigations into the objectives and contents of Aural Training, and information on cultural differences between the three countries.

In the third part a model for an integrated Aural Training approach was suggested. Because of the often addressed inadequately prepared prospective Aural Training student with an underdeveloped musical consciousness, it was decided to recommend an integrated Aural Training approach for children who start with instrumental/vocal instruction. This model aims to equip young musicians with a developed musical consciousness through the teaching of Aural Training in the form of composition, taking into account music psychological principles of music learning. The two corner stones of this model are (a) that Aural Training should be based on music psychological principles, and (b) the conviction that the most effective learning takes place through active involvement and creation.

A survey of music psychological principles such as *Gestalt* perception, developmental research (Piaget, Gardner and Swanwick-Tillman) and musical thinking processes (Prince and Webster) revealed that:

(a) Music is perceived as organised patterns.
(b) Isolated stimuli have no meaning and depth.
(c) Meaningful listening is only possible within a pitch-rhythm context.
(d) The ability to organise stimuli improves with learning. The perception of simple melodic structures was already observed in three- to four- year- old children.
(e) Teaching approaches should include both perceptual and structural tasks.
(f) Sound should precede symbol in music teaching. The use of written symbols to represent music was observed in five- to six- year- old children.
(g) Figural graphic representations of rhythm precede metric drawings.
(h) Mere imitation tasks are not an indication of musical understanding.
(i) Musical development is closely linked to age and music education. More detailed levels of perception are reached by older and musically educated children.
(j) The pre-adolescent is optimally equipped to learn.
(k) The seven- year- old child already possesses the intuitive creative ability to work with symbol systems on an elementary level.
(l) Significant relationships were found between visual-spatial abilities, musical aptitude and the ability to compose, which declined after puberty.
(m) Critical reasoning develops between 12 and 15 years of age and often hampers creativity. It was therefore recommended that critical reasoning should be introduced during pre-adolescence in order to avoid this decline of interest.
(n) Musical composition proved to be an indicator of musical development.
(o) Learning/thinking does not only depend on musical aptitude, but also on thinking processes such as divergent and convergent reasoning, musical-logical and musical-grammatical thinking processes, as well as developed memory abilities such as audiation, short-term and long-term memory. The need for the development of creative thinking abilities was also expressed.

These findings furthermore implied that (a) children aged 7 to 11 are adequately equipped to deal with patterns in a pitch-rhythm context, implying both the incorporation of phrases as well as whole compositions into Aural Training; (b) children are increasingly able to present what was heard in figural and metric drawings after 6 years of age; (c) Aural Training should be approached through dealing with wholes, but should at the same time attend to the development of more detailed aural concepts; (d) divergent, convergent, musical-logical and musical-grammatical thinking processes should be developed; (e) all students should be exposed to the development of creative abilities and thinking processes, and not just the obviously gifted children; (f) auditory critical reasoning should be included from the beginning of instrumental instruction.

Based on these principles, it was argued that composition served as an optimal tool to achieve all the goals of Aural Training. The development of the musical consciousness takes place through exploring, applying and correcting students' own creative concepts. Through composition, a holistic comprehensive approach can be applied to Aural Training. The student becomes playfully acquainted with all the parameters of music and their relationships to one another, treated within a musical context. Overall structural and stylistic aspects are addressed while at the same time attending to perceptual details. Through the important phase of notating the composition (translating sounds into symbols), the student also becomes acquainted with written theory skills. During this phase, a variety of other Aural Training methods, e.g. conducting meter, clapping rhythms, identifying and singing intervals, aid the encoding process. The important aspect of critical reasoning (evaluation) is also developed. The final composition can also serve as the basis for developing other exercises such as transposition (vocal or instrumental), playing certain chord progressions in other keys, clapping/intoning rhythmic patterns that appeared in the composition and sight singing typical intervals. Relationships to the same appearances in the music repertoire and the student's pieces that he performs should always be emphasised. This model can also be applied to tertiary Aural Training.

Examples from teaching practice revealed that this integrated theory of Aural Training indeed served the purpose of starting to develop a conscious understanding of the parameters of music and their relationships to each other.

2. CONCLUSIONS

Against the background of the above information, it was concluded that:

1. The rational behind Aural Training has not been thoroughly thought through by most authors and Aural Training lecturers.

2. Aural Training lecturers with sound pedagogical credentials are needed.

3. Prospective music students are not prepared for their tertiary Aural Training courses.

4. The Aural Training curricula at most tertiary music institutions do not meet lecturers' expectations. More instruction time is required and both individual and group tuition preferred.

5. The Behaviourist school of psychological thinking still influences Aural Training literature and teaching methods. This can be clearly seen in the supportive role of Aural Training as described in the majority of Aural Training literature, the fragmented drill and practice teaching methods, as well as the isolated treatment of musical parameters outside of a musical context. This influence also filtered through to both forms of programmed instruction. The application of Behaviourist learning theories, however, is a direct contradiction of how music is actually perceived.

6. Aural Training lecturers do not take recent research results into account. Holistic approaches to Aural Training based on music psychological findings have been recommended since the early 1980s. As was seen in the questionnaire-based survey however, fragmented approaches still overshadow more creative teaching methods.

7. Certain Aural Training methods such as Sight Singing and Dictation are often applied because they are readily quantifiable.

8. Most emphasis is placed on tonal music.

9. Commercially available software is chosen because they are available and not because they are based on sound pedagogical principles.

10. Despite the fact that the majority of lecturers do not put into practice the findings of recent research results, there is a growing interest in re-examining Aural Training goals and applying music psychological principles.

3. RECOMMENDATIONS

Several weaknesses could be found in the complete picture of Aural Training. It is therefore recommended that:

1. Aural Training lecturers should constantly re-examine their objectives, contents, teaching philosophies and methods applied to Aural Training.

2. In order to meet the need for adequately trained Aural Training lecturers, advanced courses in Aural Training for students interested in taking Aural Training as a major subject should be offered at all tertiary music institutions.

3. The Aural Training curriculum should be revised at most tertiary music institutions in order to make available more instruction time, and to incorporate both individual and group tuition. A possible time schedule could be:

   Individual instruction: 30 minutes per week
   Group tuition: 2 x 45 minutes per week
   Seminar on e.g. aural analysis, comparisons of different interpretations of the same work: 60 minutes per week
   Non-mandatory subjects: Themes such as *Rhythm in the Twentieth Century*, *The Development of the Sonata in the Classical and Romantic periods* can be treated from an aural point of view. Smallscale investigations in which students experiment with, for example, the strengths and weaknesses of the ear and different teaching methods can be included.

4. Aural Training should be treated as a subject in its own right in grading policies.

5. Courses in the didactics of Aural Training should be offered at all tertiary music institutions to **all** music students. The contents of this course should include becoming acquainted with the objectives of Aural Training, different teaching philosophies, the contents of Aural Training, learning theories based on music psychological research results and ways of integrating Aural Training into instrumental lessons of beginner pupils. This knowledge gained should be applied in students' teaching trial lessons to fellow classmates and junior students.

6. Behaviorism in the form of mere drill and practice should be banned from Aural Training, and should be replaced by a comprehensive holistic approach in the form of contextual Aural Training. In all methods attention should be paid to the overall form scheme (structural hearing) as well as details (perceptual hearing). Structural hearing (macroscopic hearing) should be included in Aural Training courses right from the beginning. According to music psychological findings, musical contours and overall structural characteristics are perceived first, and not details.

7. Music examples from all style periods as well as music of different ethnic groups should be included in the syllabi of all three countries. Because of the multiracial population in the RSA, it is furthermore recommended that a textbook based on a comprehensive, holistic approach to Aural Training, incorporating indigenous African music, should be published.

8. Other less readily quantifiable and more creative methods such as conducting using free gestures, completion tasks, graphic representations, composition, improvisation, verbal descriptions using self-developed terminology, score reading, imagination tasks and aural analysis should receive more attention in order to balance the unhealthy emphasis on Sight Singing and Dictation. Evaluation policies should also be re-examined in order to develop assessment techniques for methods other than Sight Singing and Dictation.

9. The holistic comprehensive teaching philosophy should also be applied to all areas of programmed instruction. Computer software should be revised in order to incorporate methods other than drill and practice. Software should be designed in order to serve pedagogical goals and not vice versa. The possibilities of CD-ROM and MIDI should be fully explored by programmers in order to present improved Aural Training software.

10. Aural Training lecturers should exercise their ability to influence software programming. It is therefore also recommended that workshops on CAT should be presented frequently in order to introduce new software and discuss the advantages and disadvantages of different software. Lecturers should be encouraged to voice their software needs, and programmers should try to meet these.

11. The use of more than one computer program is recommended because the programs often support each other by covering different teaching areas.

12. Lecturers should keep up with the latest research results and find ways of incorporating these into their Aural Training curricula and syllabi. Through this, the application of inefficient methods, or the omission of other valuable newer methods can be avoided.

13. International contact should be established between different Aural Training departments in the form of international conferences held periodically.

14. More research should be done in the application of music psychological research to Aural Training, the objectives of Aural Training, computer-assisted Aural Training and cultural differences.

15. It is finally recommended that children taking instrumental/vocal lessons should start with Aural Training from their very first lesson, applying the researcher's model of integrated Aural Training through composition. Through the conscious development and application of creative skills, a life-long exciting journey of exploring music is started.

* * *

BIBLIOGRAPHY

Adler, Samuel — **Sight Singing**. New York: W.W. Norton, 1979.

Adorno, Theodor W. — **Einleitung in die Musiksoziologie.** Frankfurt/Main: Suhrkamp, 1968.

Aiello, Rita, J.S. Tanaka and Wayne C. Winborne — "Listening to Mozart: Perceptual Differences among Musicians" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 269-293.

Alldahl, Per-Gunnar — "Teaching Music Theory: The European Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 111-123.

Allvin, Raynold L. — "Do Colleges and Universities need an Automated Music Learning Center?" in **Bulletin of the Council for Research in Music Education**, 21/2 (1970) pp. 32-46.

"Computer-Assisted Music Instruction: A Look at the Potential" in **Journal of Research in Music Education**, 19/2 (1971) pp. 129-143.

Arenson, Michael — "The Effect of a Competency-Based Computer Program on the Learning of Fundamental Skills in a Music Theory Course for Non-Majors" in **Journal of Computer-Based Instruction**, 9/2 (1982) pp. 55-58.

Aretinus, Guido — **Epistola Guidonis Michaeli Monacho de ignoto cantu directa.** German translation by M. Hermesdorff, **Brief Guido's an den Mönch Michael über einen unbekannten Gesang**. Trier: Paulinus-Druckerei, 1884.

Arnold, Ekkehard — "Gehörbildungsprogramme - Zurück zum Drill, vorwärts zur Vernetzung?" in **Musik und Bildung**, 5 (1990) pp. 275-278.

"Nicht nur das Ohr... Gehörbildungsprogramme für die Schule" in **Musik und Bildung**, 12 (December 1990) pp. 700-704.

Ashley, Richard Douglas — **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign, 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

Baer, Walter — "Systematische Hörschulung - wie und wozu?" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Barkowsky, John J. — "An Investigation into Pitch Identification Behavior of Absolute Pitch and Relative Pitch Subjects" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1688-A.

Bartle, Barton K. — **Computer Software in Music and Music Education: A Guide.** London: Scarecrow, 1987.

Battke, Max — **Die Erziehung des Tonsinnes - 304 Übungen für Ohr, Auge und Gedächtnis.** Berlin-Gr. Lichterfelde: Chr. Friedrich Vieweg, 1905.

Primavista - Eine Methode, vom Blatt singen zu lernen. 'West'-Berlin: Albert Stahl, 1900.

Unerschöpfliche Übungen für das Primavistasingen und für den Rhythmus in Form von achttaktigen veränderbaren Notenreihen, verwendbar auch für das Musikdiktat. Berlin-Gr. Lichterfelde: Chr. Friedrich Vieweg, 1913.

Benward, Bruce — **Sightsinging Complete.** Dubuque, Iowa: Wm. C. Brown, 1973.

Workbook in Advanced Ear Training: Teachers Dictation Manual. Dubuque, Iowa: Wm.C. Brown, 1961.

Berkowitz, Sol, Gabriel Fontrier and Leo Kraft — **A New Approach to Sight Singing.** New York: W.W. Norton, 1976.

Bester, Hilda — **Gehooropleiding in the Twintigste eeu met spesiale verwysing na Nuwe Musiek.** Unpublished Master's thesis, University of Stellenbosch 1983.

Biock, Hans-Reinhard — **Zur Intonationsbeurteilung kontextbezogener sukzessiver Intervalle.** Regensburg: Gustav Bosse, 1975.

Blais, F. and M. Prével — "The Melocapteur: A Pitch Extractor Peripheral Design for Ear Training in Music", lecture read at the **Fourth Canadian Symposium on Instructional Technology: Computer Technologies for Productive Learning**. Winnipeg, Manhattan: National Research Council of Canada, 1983 pp. 515-518.

Bland, Leland D. — **Sight Singing through Melodic Analysis.** Chicago: Nelson-Hall, 1984.

Blease, Derek — **Evaluating Educational Software.** London: Croom Helm, 1986.

Blombach, Ann K. — "OSU's GAMUT: Semi-intelligent Computer-Assisted Music Ear Training" lecture read at the **Sixth International Conference on Computers and the Humanities 1983.** Rockville, MD: Computer Science Press, 1983 pp. 14-15.

Blombach, Ann K. and Regena T. Parrish — "Acquiring Aural Interval Identification Skills: Random vs Ordered Grouping" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 113-131.

Bodenstein, Nancy Marie — "The Teaching of Selected Musical Concepts in the College Music Survey Course utilizing the Taped Guided Listening Technique" in **Dissertation Abstracts International**, 36/3 (September 1975) p. 1362-A.

Böhm, Kurt — "Das Konzept der Gehörbildung an der Musikakademie und am Konservatorium Zürich" in **Schweizerische Musikzeitung**, 122/6 (November/December 1982) pp. 373-374.

Borris, Siegfried — "Klangbilder und Hörmodelle der neuen Musik" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962.

Bozone, John Michael — "The Use of Sight Singing as a Prestudy Aid for the Improvement of the Sight-Reading Skill of Second-Semester Class Piano Students" in **Dissertation Abstracts International**, 47/7 (January 1987) p. 2358-A.

Bredemeier, Greta Johnson — **A Descriptive Study of the Pitch-Reading Methods and the Amount of Time utilized to teach Sight Singing by High School Choral Teachers in the North Central Region of the American Choral Directors Association.** Master's thesis, University of Nebraska 1987. Ann Arbor, Michigan: University of Microfilms International, 1987.

Bresler, Liora — "The Role of the Computer in a Music Theory Classroom: Integration, Barriers, and Learning" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1689-A.

Breuer, Wolfgang — **Gehörbildung - Für Unterricht und Selbststudium.** Stuttgart: J.B. Metzler, 1991.

Bridges, Nicholas — "The Development of Aural Perception of Selected Percepts of Musical Form utilizing Programmed Instruction" in **Dissertation Abstracts International**, 43/4 (October 1982) pp. 1073-A - 1074-A.

Brink, Emily Ruth — **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University, Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980.

Brown, C. Foster — **The Sight and Sound of Music - A New and Easy Method of Learning to Read Music.** London: The Cresset Press, 1969.

Brown, Thomas Walker — "An Investigation of the Effectiveness of a Piano Course in Playing by Ear and Aural Skills Development for College Students" in **Dissertation Abstracts International**, 51/12 (June 1991) pp. 4052-A - 4053-A.

Brühl, Karl W. — **Materialien zur Didaktik und Methodik des Musikunterrichts, Band 6: Materialien zur Hörschulung mit 36 Hörbeispiele auf Tonband.** Wiesbaden: Breitkopf and Härtel, 1978.

Buccheri, John — "Musicianship at Northwestern" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 125-145.

Burns, Edward M. and W. Dixon Ward — "Intervals, Scales and Tuning" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982.

Butler, Catherine (Ed.) — **Directory of Music Faculties in Colleges and Universities, U.S. and Canada 1990-92.** Missoula, MT: CMS Publications, 1990.

Campbell, Bruce B. "Music Theory Software for the Macintosh" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 133-162.

Campenni, Catherine Estelle **Contour and Rhythm as Determinants of the Perceptual Organiziation of Complex Auditory Stimuli.** Doctoral dissertation, Adelphi University 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

Canelos, James J,. Barbara A. Murphy, Ann K. Blombach and William C. Heck "Evaluation of Three Types of Instructional Strategy for Learner Acquisition of Intervals" in **Journal of Research in Music Education**, 28/4 (1980) pp. 243-249.

Carlsen, James C. **Melodic Perception: A Program for Self-Instruction.** New York: McGraw-Hill, 1965.

"Programed Learning in Melodic Dictation" in **Journal of Research in Music Education**, 12/2 (1964) pp. 139-148.

"Implications of Recent Research Problems in Programed Music Instruction" in **Bulletin of the Council for Research in Music Education**, 4 (Winter 1965) pp. 30-35.

Cawood, J., F.B. Müller and J.F.A. Schwartz **Grondbeginsels van die didaktiek.** Goodwood: National Educational Press, 1982.

Chailley, Jacques "Ut queant laxis et les Origines de la Gamme" in **Acta Musicologica** LVI (1984): Facs. I pp. 48-66.

Choksy, Lois **The Kodály Context: Creating an Environment for Musical Learning.** Englewood Cliffs, N.J.: Prentice-Hall, 1981.

City of Erlangen, Siemens, Bavarian Broadcast Company and the Friedrich-Alexander-University Erlangen-Nürnberg **Festival des Hörens: Programmübersicht 20-30.9.1990.** Erlangen: Palais Sutterheim, Markplatz 1, 1990.

Cluny, Odo of "Enchiridion musices" in Oliver Strunk, **Source Readings in Music History**. New York: W.W. Norton, 1950 pp. 103-107.

Colwell, Richard **The Evaluation of Music Teaching and Learning.** Englewood Cliffs, New Jersey: Prentice-Hall, 1970.

Conant, Barbara H. **A Study of Cognitive Processes of Children Creating Music in a Computer Learning Environment.** Doctoral dissertation, University of Massachusetts, 1988. Ann Arbor, Michigan: University of Microfilms International, 1988.

Dalby, Bruce Foreman "A Computer-Based Training Program for the Development of Harmonic Intonation Discrimination Skill" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1974-A - 1975-A.

Dames, Jean and Douglas Susu-Mago "Mr. Metro Gnome/Rhythm I" in **Clavier**, November 1986 pp. 34-35.

Damschroder, David A. "Flexibility in the Theory Classroom: Strategies for the Management of Diversity" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 177-187.

Daniels, Melvin Lucas "An Investigation of the Effectiveness of Programed Learning in the Teaching of Harmonic Dictation in a Beginning College Music Theory Course" in **Dissertation Abstracts International**, 26/11 (May 1966) pp. 6544-A - 6545-A.

Darazs, Arpad and Jay Stephen **Sight and Sound - Visual Aid to Melody and Harmony.** Oceanside: New York: Boosey and Hawkes, 1965.

Davidson, Lyle, Larry Scripp and Joan Meyaard "Sightsinging at New England Conservatory of Music: Part One to Three" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 3-68.

Davies, John Booth **The Psychology of Music.** Stanford, California: Stanford University Press, 1978.

De Marbaix, Marcel — "Rhythmisches Erfassen bei der musikalischen Grundschulung" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Deihl, Ned C. and Rudolf E. Radocy — "Computer-Assisted Instruction: Potential for Instrumental Music Education" in **Bulletin of the Council for Research in Music Education**, 15 (Winter 1969) pp. 1-7.

DeLone, Richard P. — **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981.

Dennis, Brian — **Experimental Music in Schools - Towards a New World of Sound.** London: Oxford University Press, 1970.

Deutsch, Diana — "Grouping Mechanisms in Music" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982.

Distler-Brendel, Gisela — "Befähigung zum musikalischen Hören als zentrales Lernziel des Musikunterrichts" in Bernhard Dopheide (Ed.), **Hörerziehung**. Darmstadt: Wissenschaftliche Buchgesellschaft, 1977.

Dixon, B.J. — "Opnamemetodes" in J. Schnetler (Ed.), **Opnamemetodes- en praktyk.** Pretoria: Human Sciences Research Council, 1989.

Dopheide, Bernhard (Ed.) — **Hörerziehung**. Darmstadt: Wissenschaftliche Buchgesellschaft, 1977.

Douglas, Bernita — **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig.** Unpublished Master's thesis, University of Stellenbosch, 1990.

Dowling, W. Jay — "Melodic Information Processing and Its Development" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982.

Dunlap, Michael Paul — "The Effects of Singing and Solmization Training on the Musical Achievement of Beginning Fifth-Grade Instrumental Students" in **Dissertation Abstracts International**, 51/2 (August 1990) pp. 444-A - 445-A.

Eckhardt, Andreas, Richard Jakoby and Eckart Rohlfs (Eds) for the German Music Association) — **Musikalmanach 1990/91.** Regensburg: Gustav Bosse, 1989.

Edlund, Lars — **Modus Novus - Studies in Reading Atonal Melodies.** London: J. and W. Chester, 1963.

Egmond, Marie — **600 Dictees.** Amsterdam: Broekmans and Van Poppel, [n.d.].

Eisele, Mark Joseph — "Development and Validation of a Computer-Assisted Instructional Lesson for Teaching Intonation Discrimination Skills to Violin and Viola Students" in **Dissertation Abstracts International**, 46/12 (June 1986) p. 3642-A.

Electronic Courseware Systems — **Instructional Software Catalog 1991.** Champaign, Illinois: Electronic Courseware Systems (ECS), 1991.

Enders, Bernd — **Lexikon Musikelektronik.** Mainz: Schott, 1985.

"Lehr- und Lernprogramme in der Musik" in Helmut Schaffrath (Ed.), **Computer in der Musik.** Stuttgart: J.B. Metzler, 1991.

Studien zur Durchhörbarkeit und Intonationsbeurteilung von Akkorden. Regensburg: Gustav Bosse, 1981.

Evans, Jeffrey — **Practica Musica Booklet and Manual Supplement Practica Musica 2.0.** Santa Barbara: Ars Nova Software, 1988.

Practica Musica - Interactive Instruction in Music Theory and Ear Training. Santa Barbara: Ars Nova Software, 1987.

Fellerer, Karl Gustav — "Der Wandel des Hörens im 16. Jahrhundert" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962.

Fischer, Ernst-Günter — "Möglichkeiten und Grenzen einer musikalischen Grundschulung der Sieben- bis Vierzehnjährigen" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Fischer, Hans (Ed.) — **Handbuch der Musikerziehung.** Berlin: Rembrandt, 1954.

Fleming, Shirley — "Music Schools and Departments" in **Musical America - International Directory of the Performing Arts 1988**, pp. 470-504.

Flender, Reinhard — "Musikerziehung mit Hilfe von Computerprogrammen" in Günther Batel, Günter Kleinen und Dieter Salbert (Eds), **Computermusik - Theoretische Grundlagen, komposi-tionsgeschichtliche Zusammenhänge, Musiklernprogramme.** Laaber: Laaber, 1987.

Foltz, Roger E. and Dorothy Gross — "Integration of CAI into a Music Program" in **Computer-Based Instruction**, 6/3 (February 1980) pp. 72-76.

Foltz, Roger E. and Alice M. Lanning — "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 243-253.

Foltz, Roger E. and Gary Wittlich — "Report on the First Institute for Music Theory Pedagogy Studies" in **Journal of Music Theory Pedagogy**, 2/2 (Fall 1988) pp. 317-320.

Friedmann, Michael L. — **Ear Training for Twentieth Century Music.** New Haven: Yale University Press, 1990.

Frisius, Rudolf — "Musikunterricht als auditive Wahrnehmungserziehung" in Egon Kraus (Ed.), **Musik in Schule und Gesellschaft: Vorträge der neunten Bundesschulmusikwoche Kassel 1972.** Mainz: B. Schott and Sons, 1972.

Galin, Pierre — **Exposition d'une Nouvelle méthode.** Paris: Rey and Gravier, 1818. (English translation by Bernarr Rainbow: Pierre Galin, **Rationale for a New Way of Teaching Music.** Clarabricken, Ireland: Boethius Press, 1983.

Gamble, Denise Kath — "A Study of the Effects of Two Types of Tonal Pattern Instruction on the Audiational and Performance Skills of First-Year Clarinet Students" in **Dissertation Abstracts International**, 50/4 (October 1989) pp. 893-A - 894-A.

Ganter, Claus — "Bewußtes Hören - Musiktheorie als Hörhilfe" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Gardner, Howard — **Art, Mind and Brain - A Cognitive Approach to Creativity.** New York: Basic Books, 1982.

Garton, Janet Claire — "The Efficacy of Computer-Based and Tape-Recorded Assistance in Second-Semester Freshmen Ear Training Instruction" in **Dissertation Abstracts International**, 42/11 (May 1982) pp. 4756-A - 4757-A.

Gauldin, Robert — "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 75-90.

Gibson, Don B. — "The Aural Perception of Nontraditional Chords in Selected Theoretical Relationships: A Computer-Generated Experiment" in **Journal of Research in Music Education**, 34/1 (1986) pp. 5-23.

Gilbert, Steven E. — "An Introduction to Trichordal Analysis" in **Journal of Music Theory**, 18/2 (Fall 1974) pp. 339-363.

Gill, Michael James — **Zyklus: A Performer's Analysis: A Video Taped Timpani Method utilizing Computer Assisted Instruction for Ear Training.** Doctoral dissertation, The University of Southern Mississippi 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Goebel, Johannes — "My Dream (Machine?)" in **Computer Music Journal**, 15/4 (Winter 1991) pp. 47-50.

Goltermann, Bernd — "Computerunterstützte Lernprogramme - Sackgasse oder Beschleunigungsspur für die Musikpädagogik?" in **Das Musikinstrument**, 38/5 (May 1989) pp. 33-34.

Goodwin, Mark Allen — "The Effectiveness of 'Pitch Master' compared to Traditional Classroom Methods in Teaching Sightsinging to College Music Students" in **Dissertation Abstracts International**, 52/1 (July 1991) p. 106-A.

Gordon, Edwin E. — **A Music Learning Theory for Newborn and Young Children.** Chicago: G.I.A., 1990.

Designing Objective Research in Music Education: Fundamental Considerations. Chicago, Illinois: G.I.A., 1986.

Learning Sequences in Music - Skill, Content, and Patterns. Chicago: G.I.A., 1988.

Gould, Murray J. — **Paths to Musical Thought.** New York: Holt, Rinehart and Winston, 1979.

Grabner, Hermann — **Neue Gehörübung.** Berlin: Max Hesses, 1962.

Graves, David Lee — "The Development of an Objective Sight Singing Achievement Test employing Electronic Measurement Apparatus" in **Dissertation Abstracts International**, 41/10 (April 1981) p. 4322-A.

Graybill, Roger — "Towards a Pedagogy of Gestural Rhythm" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 1-50.

Green , Barry and W. Timothy Gallwey — **The Inner Game of Music.** New York: Achor Press, 1986.

Growe, Edgar, Annie Lawton and Gillies W. Whittaker (Eds) — **The Folk Song Sight Singing Series, Books 1-12.** London: Oxford, 1933.

Grube, Christian — "Ist Blattsingen wirklich so schwer?" in **Musica**, 43/3 (May/June 1989) pp. 210-214.

Gruhn, Wilfried — "Editorial" in **Musik und Unterricht**, 2/7 (March 1991) p. 3.

Güldenstein, Gustav — **Gehörbildung für Musiker: Ein Lehrbuch.** Basel: Schwabe, 1971.

Haas, Hubert — **Unterrichtsmethoden im Lernbereich Musikhören.** Unpublished article, [n.d.].

Haas, Hubert and Erhard Karkoschka — **neue musik hören - Eine Hörerziehung mit neuer Musik in Theorie und Praxis.** Rohrdorf: Rohrdorf, 1981.

Haendsche, Theodore Alexander — **The Aural Recognition of Sonorities**. Unpublished Master's thesis, University of Texas, 1955.

Hammer, Harry — "An Experimental Study of the Use of the Tachistoscope in the Teaching of Melodic Sight Singing" in **Journal of Research in Music Education**, 11 (1963) pp. 44-54.

Harenberg, Michael — **Neue Musik durch neue Technik? Musikcomputer als qualitative Herausforderung für ein neues Denken in der Musik.** Kassel: Bärenreiter, 1989.

Hargreaves, David J. — **The Developmental Psychology of Music**. Cambridge: Cambridge University Press, 1986.

Haspelagh, Jan — "Algemene muziekopvoeding als auditive waarnemingsopvoeding (1)" in **Adem** 24/5 (1988) pp. 86-90.

Hassler, Marianne — "Kompositionstalent bei Mädchen und räumliche Begabung" in Klaus-Ernst Behne, Günter Kleinen and Helga de la Motte-Haber (Eds), **Musik Psychologie - Empirische Forschungen - Ästhetische Experimente**, 2, 1985 pp. 63-85.

Musikalisches Talent und räumliche Begabung. Doctoral dissertation, Eberhard-Karls-University Tübingen, 1984. Tübingen: Bölk, 1984.

Hattingh, D.L. — **Programmed Instruction**. Pretoria: Human Sciences Research Council, 1976.

Helms, Siegmund — "Auge und Ohr - Zur Visualisierung von Musik und Musikalisierung von Bildern" in **Musik und Unterricht**, 1/2 (May 1990) pp. 2-11.

Hempel, Christoph — **Gehörbildung - Anleitungen und Material für das gemeinsame Üben.** Zürich: Karl Heinrich Möseler, 1976.

Instruction Manuals of the Audimax computer programme: **Diatonische Melodien (1987), Diatonische Melodien mit chromatischen Nebennoten (1987), Akkorde (1989), Intervalle (1989), Punkdiktate (1989), Rhythmus V.1.0 (1990).** Hannover: Prof. Christoph Hempel, Hochschule für Musik und Theater.

'midi-pädagagogische schriftenreihe', Heft I: Der Einsatz des Computers in der Gehörbildung. Berlin: Musiklabor Ekkehard Arnold, 1990.

Hempel, Christoph and Andreas Lehmann — **TELG - Testreihe zur Ermittlung von Lernfortschritten in der Gehörbildung.** Pre-publication copy of the authors' contribution to a panel discussion during the *KlangArt-KonGreß* held at the University of Osnabrück in 1991.

Henson, Michael — "A Conference on Aural Training" in **British Journal of Music Education**, 4/3 (November 1987) pp. 301-302.

Herder, Ronald — **Tonal/Atonal progressive Ear Training, Sight Singing and Dictation Studies in Diatonic, Chromatic, and Atonal Music.** New York: Continuo Music Press, 1973.

Hesser, Lois Annette — **Effectiveness of Computer-Assisted Instruction in Developing Music Reading Skills at the Elementary Level.** Doctoral dissertation, State University of New York at Albany 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Heyde, Eva Marie — **Was ist absolutes Hören? Eine musikpsychologische Untersuchung.** München: Profil, 1987.

Hickmann, Hans — "Handzeichen" in **Die Musik in Geschichte und Gegenwart,** 5 pp. 1443-1459.

Higgins, William R. — **Computer Applications in Music Education for the Apple II Series, Macintosh & IBM Microcomputers.** Grantham, Pennsylvania: Higgins, 1990.

Hildebrandt, Carolyn — "Structural-Developmental Research in Music: Conservation and Representation" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development.** New York: Springer, 1987.

Hindemith, Paul — **Elementary Training for Musicians.** London: Schott, 1949.

Hiranpradist, Barbara Ruth — **Formal Operational Thought as a Dimension of Music Listener Behavior.** Doctoral dissertation, Michigan State University 1986. Ann Arbor, Michigan: University Microfilms International, 1986.

Hirsbrunner, Theo — "Anleitungen zum verstehenden Hören während des Unterrichts in Formenlehre und Musikgeschichte" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Hodel, Brian — "Ear Training for Guitarists" in **Guitar Review**, 68 (Winter 1987) pp. 1-6.

Hoffmann, Volker — "Hörerziehung oder auditive Wahrnehmungserziehung: Anmerkungen zu anthropologischen kybernetischen und äesthetischen Aspekten" in **Musik und Bildung**, 7/6 (1976) pp. 305-308.

Hofstetter, Fred T. — **Computer Literacy for Musicians**. Englewood Cliffs, New Jersey: Prentice-Hall, 1988.

"Computer-Based Aural Training: The Guido-System" in **Journal of Computer-Based Instruction**, 7/3 (February 1981) pp. 84-92.

The GUIDO Music Learning System: Ear-Training Lessons IBM PC Version 2.1 - Student Guide. Delaware: University of Delaware, 1989.

Hohlfeld, Christoph — **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.].

Theorie der Melodie. Unpublished manuscript, [n.d.].

Holsinger, Erik — "The Musical Tutor" in **MacWorld**, December 1987 pp. 148-149.

Horacek, Leo and Gerald Lefkoff — **Programmed Ear Training Vols. 1-4.** New York: Harcourt Brace and World, 1970.

Houlahan, Micheál and Philip Tacka — "Sound Thinking: A Suggested Sequence for Teaching Musical Elements Based on the Philosophy of Zoltan Kodály for a College Music Theory Course" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 85-109.

Hug, Theo — "Unser Gehör und Intonationsprobleme des Streichers" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Hughes, Andrew and Edith Gerson-Kiwi — "Solmization" in **The New Grove Dictionary of Music and Musicians**, 17 pp. 458-467.

Humphries, James Avery — "The Effects of Computer-Assisted Aural Drill Time on Achievement in Musical Interval Identification" in **Journal of Computer-Based Instruction**, 6/3 (February 1980) pp. 91-98.

Hundoegger, Agnes — **Leitfaden der Tonika-Do-Lehre.** Berlin: Tonika-Do, 1925.

Hutton, Doris — "A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade" in **Journal of Research in Music Education**, 1 (Fall 1953) pp. 119-126.

Illman, Michael — **Systematic Aural Training - Teacher's book.** London: Longman: 1970.

Jaques-Dalcroze, Émile — **Eurhythmics, Art and Education.** Ann Arbor, Michigan: University Microfilms International, 1979. Original French publication in 1912.

Jenkins, Yolanda — "Multimedia Technology: Tools for Early Learning" in Sueann Ambron and Kristina Hooper (Eds), **Learning with Interactive Multimedia - Developing and Using Multimedia Tools in Education.** Redmond, Washington: Microsoft Press, 1990.

Jerrentrup, Ansgar — "Die Angst des Musiklehrers vor Bomben und anderen Überraschungen beim Einsatz des Computers im Unterricht" in **Musik und Bildung**, 6 (1989) pp. 331-333.

"JS" — "David L. Burge: *The Relative Pitch Ear-Training Course*" in **Guitar Player**, 22 (March 1988) p. 149.

Karkoschka, Erhard — **Das Schriftbild der neuen Musik.** Celle: Moeck, 1966.

"Eine Hörpartitur elektronischer Musik" in **Musik und Bildung**, 63/5 (May 1972) pp. 221-226.

Karpinsky, Gary S. — "A Model for Music Perception and its Implications in Melodic Dictation" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 191-229.

"Ear Training and Integrated Aural Skills: Three Recent Texts" in **Journal of Music Theory Pedagogy**, 3/1 (Spring 1989) pp. 127-149.

"Five Recent Sightsinging Texts" in **Journal of Music Theory Pedagogy**, 2/2 (Fall 1988) pp. 275-296.

Killam, Rosemary — "Solmization with the Guidonian Hand: A Historical Introduction to Modal Counterpoint" in **Journal of Music Theory Pedagogy**, 2/2 (Fall 1988) pp. 251-274.

Kleinermanns, Ralf — "Advanced Keyboard Tabulator: Keyboard-Lernprogramm für Atari ST" in **Keyboards - Homerecording & Computer**, October 1991 pp. 118-123.

"C-Lab Education Software: Lernprogramme für Atari ST" in **Keyboards - Homerecording & Computer**, November 1990 pp. 122-138.

Koch, Peter — **blattlesen in der schule - die nü-methode.** Vienna: Universal Edition, 1972.

Kolneder, Walter — "Visuelle und auditive Analyse" in **Veröffentlichungen des Instituts für Neue Musik und Musikerziehung Darmstadt, Band 3: Der Wandel des musikalischen Hörens.** Berlin: Merseburger, 1962.

Kozerksi, Russell A. — **Personal Computer Microworlds for Music Composition and Education.** Doctoral dissertation, University of California, San Diego 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Kraft, Leo — **A New Approach to Ear Training - A Programed Course to Melodic Dictation.** New York: W.W. Norton, 1967.

Kral, Walter and Ivo Zopf — **Gehörbildung - Lehrgang für individuelles Selbststudium, Band 1.** Vienna: Österreichischer Bundesverlag, 1989.

Krathwohl, Bloom and Masia — **Taxonomy of Educational Objectives - The Classification of Education Goals, Handbooks I and II.** New York: David McKay, 1956 and 1964.

Kratochwil, Heinz — "Hörerziehung in der Ausbildung zum Musikpädagogen" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Kühn, Clemens — **Gehörbildung im Selbststudium.** Kassel: Bärenreiter, 1983.

Kuhn, Wolfgang E. and Raynold E. Allvin — "Computer-Assisted Teaching: A New Approach to Research in Music" in **Journal of Research in Music Education**, 15/4 (1967) pp. 305-315.

Kuzmich, John (Jr.) — "Tuning Software: Applied Ear Training!" in **The School Musician**, 58 (November 1986) pp. 4-11.

Lamb, M.R. and R.H.T. Bates — "Computerized Aural Training: An Interactive System Design to Help Both Teachers and Students" in **Journal of Computer-Based Instruction**, 5/1-2 (1978) pp. 30-37.

Lange, Georg — "Zur Geschichte der Solmisation" in Oskar Fleischer and Johannes Wolf (Eds), **Sammelbände der internationale Musikgesellschaft, Erster Jahrgang 1899-1900.** Leipzig: Breikopf and Härtel, [n.d.].

Lehr, Wilhelm — "Gehörbildung, Gehörtraining, Hörerziehung" in **Neue Musikzeitung**, 34/5 (October/November 1986) pp. 26-27.

Leonhard, Charles and Robert W. House — **Foundations and Principles of Music Education.** New York: McGraw-Hill, 1972.

Levin, Robert D. and Louis Martin — **Sight Singing and Ear Training Through Literature.** Englewood Cliffs, N.J.: Prentice-Hall, 1988.

Lieberman, Maurice — **Ear Training and Sight Singing.** New York: Holt, Rinehart and Winston, 1959.

Loeb van Zuilenburg, Paul — "Aspects of Aural Training" in **Music in Education**, 39/371 (1975) pp. 23-25.

"Aural Training and its Relation to the Teaching of Harmony and Counterpoint" in **Ars Nova**, 7/1 (1975) pp. 19-28.

"Die Gebruik van Gordon se 'Musical Aptitude Profile' by die keuring van Voltydse Musiekstudente van die Universiteite Stellenbosch en Kaapstad" in **South African Journal of Musicology**, 11 (1991) pp. 43-72.

Gehoortoetse en Gehooropleiding - 'n Inleiding. Stellenbosch: Cabo, [n.d.] c. 1977.

London, Justin — "'One Step Up': A Lesson from Pop Music" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 111-114.

Lonnendonker, Hans — "Musiktheoretisches Grundstudium an der Musikhochschule des Saarlandes in Saarbrücken" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Lorek, Mary Jo — "Computer Analysis of Vocal Input: A Program that Simulates College Faculty Sight Singing Evaluation" **Computers in Music Research**, 3 (Fall 1991) pp. 121-138.

Lorek, Mary Jo and Randall G. Pembrook — "Present and Future Applications of a Microcomputer-Based Frequency Analysis System" in **Psychomusicology**, 8/2 (1989) pp. 97-109.

Luce, John R. — "Sight-Reading and Ear-Playing Abilities as Related to Instrumental Music Students" in **Journal of Research in Music Education**, 13/2 (Summer 1965) pp. 101-109.

Macek, Karl — "The Photographic Ear" in **The Piano Quarterly**, 35/137 (1987) pp. 46-48.

Mackamul, Roland — "Effektivitätsmindernde Faktoren im Bereich der Gehörbildung" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

"Gehörbildung - wo und wann? (I)" in **Schweizerische Musikzeitung**, 123/2 (March/April 1983) pp. 98-101.

"Gehörbildung - wo und wann? (II)" in **Schweizerische Musikzeitung**, 123/3 (May/June 1983) pp. 164-166.

Lehrbuch der Gehörbildung, Bänder I und II. Kassel: Bärenreiter, 1969.

MacPherson, Stewart and Ernest Read — **Aural Culture based upon Musical Appreciation, Part I.** London: Joseph Williams, 1953.

Magic Music — **Der Katalog: Ich mach' Musik mit'm PC.** Öhringen: Magic Music 1991.

IBMusikalisch? Katalogisch! Hard- und Software Stand 3/90. Öhringen: Magic Music 1990.

MIDIA TIMES: Info für Musik und Computer, Piano und MIDI. Schwabbach: Magic Music, Autumn 1992.

Makas, George — "Sebastian II" in **The Instrumentalist**, May 1986 pp. 76-79.

Mann, Rochelle — "Why should Elementary Students have all the Fun?" in **Music Educators Journal**, 76 (September 1989) pp. 39-42.

Martens, Heinrich — **Musikdiktat und musikalisches Schreibwerk in der Schule mit anschließendem methodisch-didaktischem Lehrgang.** Wolfenbüttel: Möseler, 1957.

Martin, Beverly Ann — **The Effect of Hand Signs, Verbal Tonal Syllables, and Letter Representations of Tonal Syllables on the Verbal and Symbolic Acquisition of Tonal Skills by First-Grade Students.** Doctoral dissertation, University of Oklahoma 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

Marvin, Elizabeth West — **A Generalized Theory of Musical Contour: Its Application to Melodic and Rhythmic Analysis of Non-Tonal Music and its Perceptual and Pedagogical Implications.** Doctoral dissertation, University of Rochester 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Mason, Thom David — "The Case for Moveable 'Do' - Solfege as a Practical Tool for Improvisors" in **Proceedings of NAJE Research** (Since 1983 **Jazz Research Papers**), 7 (1987) pp. 95-107.

Mayr-Kern, Josef (Ed.) — **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

McLoud McGaughey, Janet — **Practical Ear Training.** Boston: Allyn and Bacon, 1966.

Meyer, Heinz — "'Aufmerksamkeit' als Lernziel der Hörerziehung" in **Musik und Bildung**, 63/5 (May 1972) pp. 227-231.

Meyer-Denkman, Gertrud — "Wahrnehmungspsychologische und neurophysiologische Aspekte des Musiklernens" in Günter Kleinen (Ed.), **Musikpädagogische Forschung, Band 5: Kind und Musik.** Laaber: Laaber, 1984.

Messer, Wolfgang — "Musikalische Grundschulung an der Hochschule Graz" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Minnesota Educational Computing Consortium (MECC) — **MECC Education Catalog 1992-1992.** Minneapolis, Minnesota: MECC, 1991.

Möller, Arnold — **Elementare Musiktheorie und Gehörbildung mit Aufgaben für den Selbstunterricht.** Frankfurt: Zimmermann, 1985.

Müller-Bech, Werner — "Anforderungen bei den Aufnahmeprüfungen der Musikhochschulen in der Bundesrepublik Deutschland bezogen auf die Musiktheorie und Gehörbildung" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Müller-Blatau, Joseph — "Gehörbildung" in **Die Musik in Geschichte und Gegenwart**, 4 pp. 1533-1540.

Münnich, Richard — **Jale - Ein Beitrag zur Tonsilbenfrage und zur Schulmusikpropädeutik.** Wolfenbüttel: Möseler, 1959.

Musikhochschulen in Germany — **Personal- und Vorlesungsverzeichnisse:** *Folkwang Hochschule Essen - Wintersemester 1990/91; Hochschule der Künste Berlin - Wintersemester 1989/90; Hochschule für Musik Detmold - Wintersemester 1990/91; Hochschule für Musik Detmold, Abteilung Dortmund - Sommersemester 1991; Hochschule für Musik Köln - Wintersemester 1989-90; Hochschule für Musik München - Studienjahr 1990/91; Hochschule für Musik Würzburg - Studienjahr 1990/91; Hochschule für Musik und darstellende Kunst Hamburg - Wintersemester 1989/90; Hochschule für Musik und Theater Hannover - Wintersemester 1990/91, Sommersemester 1991; Musikhochschule des Saarlandes - Wintersemester 1990/91; Musikhochschule Lübeck - Wintersemester 1990/91; Robert-Schumann-Hochschule Düsseldorf - Sommersemester 1990; Staatliche Hochschule für Musik Freiburg/-Breigau - Sommersemester 1991; Staatliche Hochschule für Musik Heidelberg-Mannheim - Wintersemester 1990/91; Staatliche Hochschule für Musik Karlsruhe - Wintersemester 1990/91; Staatliche Hochschule für Musik Trossingen - Wintersemester 1990/91; Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart Winter-/Sommersemester 1988/89 - 1991/1992.*

Naudé, Anna C. — **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987.

Neiman, Marcus L. — "Aural Skills Trainer" in **The Instrumentalist**, May 1987 p. 88.

"CAMUS: Melodic Dictations" in **The Instrumentalist**, January 1987 p. 77.

"Early Music Skills" in **The Instrumentalist**, February 1987 p. 12.

"Music Education Series" in **The Instrumentalist**, November 1987 pp. 8-10.

"The Rhythm Machine" in **The Instrumentalist**, September 1986 p. 95.

"Tuner Intonation Drill" and "Interval DrillMaster" in **The Instrumentalist**, August 1986 pp. 49-50.

Neumann, Annemarie — "Musiktheorie und Gehörbildung unter instrumentimmanenten Aspekten" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Newquist, Harvey P. — **Music & Technology.** New York: Billboard Books, 1989.

Obermayer, Klaus (Ed.) — **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987.

O'Brien, Wanda Teresa — "A Comparison of the Use of Analytical Language with the Use of a Combination of Figurative and Analytical Language and their Effects on Attitude and Conceptual Understanding of Music among Seventh-Grade Students" in **Dissertation Abstracts International**, 50/7 (January 1990) p. 1975-A.

O'Connor, Sister Margaret Grace — "Development of Discriminatory Music Listening Skills in the Junior High School utilizing Programmed Instruction" in **Dissertation Abstracts International**, 37/3 (September 1976) p. 1446-A.

Olson, Robert G. — **Music Dictation: A Stereo-Taped Series.** Belmont, California: Wadsworth, 1970.

Ottman, Robert W. — **More Music for Sight Singing.** Englewood Cliffs, N.J.: Prentice-Hall, 1981.

Music for Sight Singing. Englewood Cliffs, N.J.: Prentice-Hall, 1967.

Ottman, Robert W., Rosemary N. Killam, Robert M. Adams, W. Kenton Bales, Steven V. Bertsche, Leslie C. Gay, Donald B. Marshall, Donald A. Peak and Douglas Ray — "Development of a Concept-Centered Ear Training CAI System" in **Journal of Computer-Based Instruction**, 6/3 (1980) pp. 79-86.

Palm, Siegfried — "Nachdenkliches beim Hören von Musik" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987.

Palmer, Mary H. — "Relative Effectiveness of Two Approaches to Rhythm Reading for Fourth-Grade Students" in **Journal of Research in Music Education**, 24/3 (1976) pp. 110-118.

Parker, Robert Clinton — "The Relative Effectiveness of the TAP System in Instruction in Sight Singing: An Experimental Study" in **Dissertation Abstracts International**, 41/1 (July 1980) p. 151-A.

Paxinos, S. — "Examination Ear Tests" in **Musicus**, 15/1 (1987) pp. 14-21.

Peery, J. Craig, Irene Weiss Peery and Thomas Draper (Eds) — **Music and Child Development**. New York: Springer, 1987.

Pembrook, Randall G. — "Some Implications of Students' Attitudes Toward a Computer-Based Melodic Dictation Program" in **Journal of Research in Music Education**, 34/2 (1986) pp. 121-133.

Pembrook, Randall G and H. Lee Riggins — "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 231-241.

Peschl, Wolf — "D-A-CH-Tagung 1987 in Regensburg" in **Muzikerziehung**, 41 (October 1987/88) pp. 12-30.

Peters, David G. — "Teacher Training and High Technology: What Involvement should Teachers have in Computer Learning?" in **Music Educators Journal**, 70/5 (January 1984) pp. 35-38.

Petzold, Robert G. — "Auditory Perception by Children" in **Journal of Research in Music Education**, 17/1 (Spring 1969) pp. 82-86.

Pflederer-Zimmerman, Marilyn — "Music Development in Middle Childhood: A Summary of Selected Research Studies" in **Bulletin of the Council for Research in Music Education**, Winter 1986 pp. 18-35.

Piaget, Jean — **The Psychology of Intelligence**. Totowa, New Jersey: Littlefield, 1960.

Placek, Robert W. — "A Model for Integrating Computer-Assisted Instruction into the Music Curriculum" in **Journal of Computer-Based Instruction**, 6/3 (February 1980) pp. 99-105.

"Basic Musicianship" in **Music Educators Journal**, 71 (Nov. 1985).

"Ear Training with Computer Assistance" in **Music Educators Journal**, 76 (April 1990) pp. 6-9.

"Foundations of Music: A Computer-Assisted Introduction" in **Music Educators Journal**, 73 (March 1987) pp. 56-58.

"GUIDO Music Learning System: Ear-Training Lessons" in **Music Educators Journal**, October 1987 pp. 76-79.

"Listen" in **Music Educators Journal**, January 1987 pp. 18-21.

"Mr. Metro Gnome/Rhythm II" in **Music Educators Journal**, 72 (January 1986) pp. 17-19.

"Tuner: Intonation Drill" in **Music Educators Journal**, 72 (February 1986) pp. 18-20.

Pogonowski, Lenore — "Critical Thinking and Music Listening" in **Music Educators Journal**, 76 (September 1989) pp. 35-38.

Poppensieker, Karin — **Musikpädagogik - Forschung und Lehre, Band 23: Die Entwicklung musikalischer Wahrnehmungsfähigkeit.** Mainz: Schott, 1986.

Potter, Gary — "Identifying successful Dictation Strategies" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 63-71.

"Putting Skills to Work: An Aural Analysis Project" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 69-84.

Pratt, George and Michael Henson — "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) pp. 115-137.

Pratt, George, Michael Henson and Simon Cargill — **Aural Awareness: Principles and Practice.** Milton Keynes: Open University Press, 1990.

Prince, Warren F. — "A Paradigm for Research on Music Listening" in **Journal of Research in Music Education**, 19 (1971) pp. 445-455.

Pütz, Werner — "Zur Hörerziehung in der musikalischen Berufsausbildung" in **Musik und Bildung**, 63/5 (May 1972) pp. 232-234.

Quistorp, Monica — **Die Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel 1979.

Ragni, Valentino — "Gehörbildung in der vorschulpflichtigen Muziekerziehung?" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987.

Rahn, Jay and James R. McKay — "The Guide-Tone Method: An Approach to Harmonic Dictation" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 101-111.

Rasch, R.A. and R. Plomp — "The Perception of Musical Tones" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982.

Ratz, Erwin — **Einführung in die musikalische Formenlehre.** Vienna: Universal Edition, 1973.

Rees-Davies, Ieuan — **Transposition at the Keyboard.** London: J. Curwen and Sons, [n.d.].

Rehberg, Karl — "Geschichte in der Musikerziehung" in Hans Fischer (Ed.), **Handbuch der Musikerziehung.** Berlin: Rembrandt, 1954.

Regelski, Thomas A. — **Principles and Problems of Music Education.** Englewood Cliffs, New Jersey: Prentice-Hall, 1975.

Resch, Hans Dieter — "Gedanken über eine systematische Gehörbildung im Instrumentalunterricht" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Richter, Christoph — "Einige Gedanken zum Verhältnis von Musik und Bewegung" in **Musik und Bildung**, 7/8 (1989) pp. 409-413.

"Höranalyse" in **Musik und Bildung**, 11/3 (May 1979) pp. 178-181.

Riede, Bernd — "Offene Ohren durch gespeicherte Klänge - Gehörbildung mit dem Computer: Fünf Programme im Vergleich" in **Neue Musikzeitung**, (April/May 1991) pp. 56-60.

Riggins, H. Lee and Howard Irving — "Creative Sightsinging" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 85-99.

Ritterman, Janet — "Review: *RAMP: Musical Awareness: A Conference on Aural Training* [Michael Henson, (Ed.) Huddersfield Polytechnic 1987]" in **British Journal of Music Education**, 5/2 (1988) pp. 195-197.

Rocholl, Christoph and Ullrich Eichner — "Musiklernen mit dem Computer" (interview with Bernd Enders) in **Instrumentenbau-Zeitschrift - Musik international**, 43 (July-August 1989) pp. 36-39.

Rösing, Helmut — "Gedanken zum 'Musikalischen Hören'" in **Die Musikforschung**, 27/2 (1974) pp. 213-216.

Rogers, Michael R. "A Report on the 1992 CMS Theory Pedagogy Institute" in **Journal of Music Theory Pedagogy**, 6/2 (1992) pp. 35-41.

Teaching Approaches in Music Theory - An Overview of Pedagogical Philosophies. Edwardsville: Southern Illinois University Press, 1984.

"Editorial: Trends and Issues in Music Theory Teaching" in **Journal of Music Theory Pedagogy**, 1/1 (Spring 1987) pp. 1-5.

Rosenstrauch, Henrietta **Essays on Rhythm Music Movement.** Pittsburgh, PA: Volkwein, [n.d.].

Rosner, Burton S. and Leonard B. Meyer "Melodic Processes and the Perception of Music" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982 pp. 68-70.

Rothstein, Joseph "Play it by Ear: Ear-Training Software for IBM PCs" in **Computer Music Journal**, 15/3 (1991) pp. 122-124.

Rudolph, Thomas E. "Technology for Teaching: Selecting a Personal Computer - Manufacturers and Models" in **Music Educators Journal**, 76 (October 1989) pp. 68-70.

Rüdiger, Hans Jörg "Schott ComputerKolleg Musik: Gehörbildungs-Software für Atari ST" in **Keyboards - Homerecording & Computer**, March 1991 pp. 144-147.

Ruhnke, Martin "Solmisation" in **Die Musik und Geschichte und Gegenwart,** 12 pp. 843-852.

Russell, Benjamin "Product review: Ear Training Software for the Mac" in **Canadian Musician** 10/3 (1988) p. 26.

Sachs, Curt **A Short History of World Music.** London: Dennis Dobson, 1956.

Schaper, Heinz-Christian **Gehörbildung compact - Teil I: Grundlagen und Übungen.** Mainz: Schott, 1989.

Schellenberg, Stephen and Randall S. Moore "The Effect of Tonal-Rhythmic Context on Short-Term Memory of Rhythmic and Melodic Sequences" in **Bulletin of the Council for Research in Music Education**, 33/2 (Fall 1985) pp. 207-217.

Schenk, Paul **Schule der musikalischen Gehörbildung - I. Teil: Gehörbildung Unterstufe und Musikkunde.** (Eight booklets.) Trossingen: Hohner, 1952.

Schläger, Theo "Ein neues Gerät zum Erstellen von Elementarpartituren im Musikunterricht" in **Musik und Bildung**, 6 (1977) pp. 353-354.

Schleuter, Stanley L. **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequences.** Kent, Ohio: The Kent State University Press, 1984.

Schnürl, Karl "Programmierte Gehörbildung im Musiksprachlabor" in Josef Mayr-Kern, (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Schwarting, Heino "Vom absoluten zum relativen Gehör" in **Üben und Musizieren**, 6/2 (April 1989) pp. 68-72.

Sekles, Bernhard **Musikdiktat - Übungsstoff in dreissig Abschnitten.** Mainz: Schott, 1901.

Shannon, Don Wayne "Aural-Visual Interval Recognition in Music Instruction: A Comparison of a Computer-Assisted Approach and a Traditional In-class Approach" in **Dissertation Abstracts International**, 43/3 (September 1982) p. 718-A.

Sherman, Robert W. and Morris H. Knight **Student Workbook for Aural Comprehension in Music, Vols. 1 and 2.** New York: McGraw-Hill, 1972.

Shumway, Stanley **Harmony and Ear Training at the Keyboard.** Dubuque, Iowa: Wm.C. Brown, 1976.

Silbermann, Alphons "Hören - Horchen - Verstehen" in Klaus Obermayer (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 15: Hören - Horchen - Verstehen.** Regensburg: Gustav Bosse, 1987.

Smeijsters, Henk "Moet de musicus worden omgeschoold tot informaticus? Technologie: diabolus in musica of gradus ad parnassum?" in **Mens en Melodie**, 42 (February 1987) pp. 52-59.

Smith, Timothy A. "A Comparison of Pedagogical Resources in Solmization Systems" in **Journal of Music Theory Pedagogy**, 5/1 (Spring 1991) pp. 1-23.

Smithee, Larry Gene "The Effects of Two Methods of Teaching Basic Concepts utilizing Twentieth-Century Music" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1975-A - 1976-A.

Soundware Catalogue **Soundware: Your MIDI Source**. Menlo Park: Soundware, Fall/Winter 1992.

Southern Illinois University Edwardsville (SIUE) Unpublished compendium of software used at SIUE: "Educational Software for Music", in **Music Computer Lab**, Winter 1990.

Spector, Irwin **Rhythm and Life - The work of Émile Jaques-Dalcroze.** Stuyvesant, NY: Pendragon, 1990.

Spitzer, Leopold "Gehörbildung: Intervall oder stillbezogene Phrase?" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Sprenger, Hermann **Methodik der Gehörbildung.** Unpublished manuscript, [n.d.].

Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart **Die Abschußprüfung in Gehörbildung,** 1985.

Stelz, Herbert "Ohrtrainer - Gehörbildung mit System" in **Katalog 1991**. Darmstadt: Wilhelm Lutz, 1991.

Stockton, James Larry "An Experimental Study of Two Approaches to the Development of Aural Meter Discrimination among Students in a College Introductory Music Class" in **Dissertation Abstracts International**, 43/3 (September 1982) p. 718-A.

Stoker, D.J. "Basiese Steekproefnemingsmetodes" in J. Schnetler (Ed.), **Opnamemetodes- en praktyk.** Pretoria: Human Sciences Research Council, 1989.

Stoverock, Dietrich **Gehörbildung - Geschichte und Methode.** Wilhelmshaven: Heinrichshofen, 1978.

Swanwick, Keith **Music, Mind, and Education.** London: Routledge, 1988.

Tarratus, Edward A. (Jr.) and Charles L. Spohn "Cooperative Research in Programed Learning: Taped Interval Discrimination Drills" in **Journal of Research in Music Education**, 15/3 (1967) pp. 210-214.

Teiner, Manfred "Das Ohr hat ganz erstaunliche Reserven: Österreich - Diskussion um Hörerziehung als gleichberechtigten Teil der Pädagogik" in **Neue Musikzeitung**, 31/3 (June/July 1982) p. 21.

Telesco, Paula "Contextual Ear Training" in **Journal of Music Theory Pedagogy**, 5/2 (Fall 1991) pp. 179-190.

Temporal Acuity Products (TAP) **Temporal Acuity Products - Music Education Solutions** (Catalogue). Bellevue, WA: TAP, [n.d.]. (Accompanying letter dated October 1991).

Thackray, Rupert "Some Thoughts on Aural Training" in **The Australian Journal of Music Education**, October 1975 pp. 25-30.

The Associated Board of the Royal Schools of Music (ARSM) **Aural Tests Part I-IV**. London: ARSM, 1972.

Thomson, William "What is an Interval?" **Journal of Music Theory Pedagogy**, 2/2 (Fall 1988) pp. 321-325.

Thornburg, David D. "Music to My Ears" in **InCider**, September 1990 pp. 89-90.

Thompson, Edgar Joseph "Sightsinging Constant Rhythm Pitch Phrases: A Computer-Assisted Instructional System" in **Dissertation Abstracts International**, 34/7 (January 1974) p. 4319-A.

Tomatz, David "Technology in Music: Cultural, Artistic and Ethical Implications" in **Proceedings of the National Association of Schools of Music**, 77 (1988) pp. 76-69.

Trinity College of Music	**Sample Ear Tests.** London: Trinity College of Music, [n.d.].
Trubitt, Allen R. and Robert S. Hines	**Ear Training and Sight Singing: An Integrated Approach, Books I and II.** New York: Schirmer Books, 1979 (I) and 1980 (II).
Trusheim, William H.	"Mental Imagery and Musical Performance: An Inquiry into Imagery Use by Eminent Orchestral Brass Players in the United States" in **Dissertation Abstracts International**, 49/4 (October 1988) p. 655-A.
Tutaj, Duane	"Software Reviews: *The Ear* in **The Instrumentalist**, 43 (March 1989) p. 10.
Ulbrich, Markus	**Freiburger Hörprogramme.** Unpublished Aural Instruction Programme (NCAT), *Staatliche Hochschule für Musik Freiburg/Breisgau*, 1983.
	Tabellen zur Notenschrift - Ein Programm für angehende Berufsmusiker. Basel: Markus Ulbrich, 1978.
University of Osnabrück	**KlangArt KonGress**. Congress Prospectus, 1991.
University of South Africa	**Practical Musicianship (Aural Tests) Appendix B, Written Examination Syllabuses.** Pretoria: UNISA, 1985.
	Practical Musicianship Grades 1 - Licentiate. Pretoria: UNISA, [n.d.].
Upitis, Rena	"Toward a Model for Rhythm Development" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development.** New York: Springer, 1987.
Van Ebbenhorst Tengbergen, M.E. and L.S. Maaré	**Solfèges**. Amsterdam: Broekmans and Van Poppel, [n.d.].
Van der Horst, F.	**Maat en Ritme**, Parts I and II. Amsterdam: Broekmans and Van Poppel, [n.d.].
Venus, Dankmar	**Unterweisung im Musikhören**. Wuppertal: A. Hein, 1969.
Vetter, Hans-Joachim	"Studienvorbereitende Ausbildung an Musikschulen in der Bundesrepublik" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.
Warburton, Annie O.	**Graded Aural Tests.** London: Longman, 1971.
Ward-Steinman, David	"Comprehensive Musicianship at San Diego State University" in **Journal of Music Theory Pedagogy**, 1/2 (Fall 1987) pp. 129-147.
Warner, Theodor	**Das Undurchhörbare - Beiträge zur Hörpsychologie und Didaktik der Moderne.** Stuttgart: W. Kohlhammer, 1969.
Warner New Media	**Newness**, 1/3 (July 1991).
	Audio Notes - specification sheet on *The Orchestra*, [n.d.].
Webster, Peter R.	"Conceptual Bases for Creative Thinking in Music" in J. Craig Peery, Irene Weiss Peery and Thomas Draper (Eds), **Music and Child Development**. New York: Springer, 1987.
Weisbrod, Fried	"Methoden der Hörerziehung und der Gehörbildung" in Wolfgang Schmidt-Brunner (Ed.), **Methoden des Musikunterrichts**. Mainz: Schott, 1982.
Weiss, Peter	"Computer können nun einmal nicht singen - Vortrag bei der D-A-CH - Tagung Ende April in Österreich - Teil 2" in **Neue Musikzeitung**, 37/4 (August/September 1988) p. 25.
Wennerstrom, Mary H.	"The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 153-176.
Wettstein, Peter	"Gehörbildung an der Musikhochschule Zürich" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Wilder, Michael David — **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written and Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral dissertation, University of Michigan 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Willemze, Theo — **Het muzikaal gehoor - vorming en ontwikkeling.** Utrecht: Aura, 1969.

Wittlich, Gary E. and Lee Humphries — **Ear Training - An Approach through Music Literature.** New York: Harcourt Brace Yovanovich, 1974.

Wittlich, Gary E., John Schaffer and Larry R. Babb — **Microcomputers and Music.** Englewood Cliffs, New Jersey: Prentice-Hall, 1986.

Woll, Erna — **Buchprogrammiertes Musiklernen.** Wolfenbüttel: Möseler, 1970.

Wolters, Klaus — "Gehörschulung im Klavierunterricht" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

Yao, Shey-Tzer — **The Aural Skills Development Program in Music Departments of Two Post-Secondary Institutions in Taiwan: Status and Recommendations.** Doctoral dissertation, Ball State University 1990. Ann Arbor, Michigan: University Microfilms International, 1990.

Yeager, Marian Ruth — **A Survey of the Corrective Listening Ability of a Group of College Music Students.** Unpublished Master's thesis, University of Texas, 1952.

Zehetmair, Helmut — "Spezielle Aufgaben einer Gehörbildung im Violinunterricht" in Josef Mayr-Kern, (Ed), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse 1978.

APPENDIX A

INVESTIGATIONS INTO AURAL TRAINING AND RELATED RESEARCH

A. OUTLINE

B. TITLES AND DETAILS

1. DIDACTICAL ASPECTS

1.1 Combined Traditional and recent perspectives

1.1.1 *Comprehensive theories*

Ashley, Richard Douglas: **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

Brink, Emily Ruth: **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980.

Davidson, Jerry Frank: **An Investigation into the Systematic Application of Performance Objectives to Ear Training.** Doctoral dissertation, Northwestern University Illinois 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

Houlahan, Micheál Brendan: "A Methodology for Teaching Ear Training, Sight Singing, and Harmony at the College Level based on the Concept of Zoltan Kodály" in **Dissertation Abstracts International**, 50/4 (October 1989) p. 825-A.

Houlahan, Micheál and Philip Tacka: "Sound Thinking: A Suggested Sequence for Teaching Musical Elements based on the Philosophy of Zoltan Kodály for a College Music Theory Course" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 85-109.

Houlahan, Micheál and Philip Tacka: "Sequential Order for the Preparation, Presentation, Practice and Evaluation of Rhythmic and Melodic Concepts" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 243-267.

Joseph, Annabelle Sachs: "A Dalcroze Eurhythmics Approach to Music Learning in Kindergarten through Rhythmic Movement, Ear-Training and Improvisation" in **Dissertation Abstracts International**, 44/2 (August 1983) p. 420-A.

1.1.2 *Integration into other music disciplines*

Bruhn, Herbert: "Wahrnehmung von dur-moll-tonalen Beziehungen zwischen Akkorden: Zur Relevanz einer Harmonielehre-Didaktik" in Christa Nauck-Börner, (Ed.) **Musikpädagogische Forschung Band 9: Musikpädagogik zwischen Traditionen und Medienzukunft.** Laaber: Laaber, 1988, pp. 229-242.

Douglas, Bernita: **Riglyne vir geïntegreerde gehooropleiding by klavieronderrig.** Unpublished Master's thesis, University of Stellenbosch 1990.

Holmes, Ramona Adella: "A Model of Aural Instruction examined in the Case of Fiddle Teaching" in **Dissertation Abstracts International,** 51/4 (October 1990) pp. 1151-A - 1152-A.

La Reau, Marcia Ann: "An Auralization-Based Curriculum as a Methodology for Advanced Aural Skills Training for Wind Band Conductors" in **Dissertation Abstracts International,** 50/12 (June 1990) p. 3882-A.

Micheel, Wilhelm: **Beiträge zur Schulmusik, Sechtes Heft: Musikunterricht in einfachen Stadt- und Landschulen - Gehörbildung und rhythmische Erziehung mit Stufen- und Rhythmussilben.** Lahr: Moriß Schauenburg, 1932.

Morawski-Büngeler, Marietta: "Gehörbildung als integriertes Fach. Neue Wege in der polnischen Musikausbildung" in **Musica**, 37/6 (1983) pp. 516-521.

Schleuter, Stanley L.: **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequence.** Kent, Ohio: Kent State University Press, 1984.

Strange, Cheryl May: "The Development of a Beginning Violin Curriculum Integrating a Computer Music Station with the Principles of Comprehensive Musicianship" in **Dissertation Abstracts International,** 51/7 (January 1991) p. 2309-A.

1.1.3 *Curriculum planning*

Alldahl, Per-Gunnar: "Teaching Music Theory: The European Conservatory" as translated by Bo Alphonce in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 111-123.

Böhm, Kurt: "Das Konzept der Gehörbildung an der Musikakademie und am Konservatorium Zürich" in **Schweizerische Musikzeitung**. 122/6 (November/December 1982) pp. 373-374.

Damschroder, David A.: "Flexibility in the Theory Classroom: Strategies for the Management of Diversity" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 177-187.

Davidson, Lyle, Larry Scripp and Joan Meyaard: "Sightsinging at New England Conservatory of Music" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 3-68.

Foltz, Roger E. and Alice M. Lanning: "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 243-253.

Gauldin, Robert: "Teaching Music Theory: The Conservatory" in **Journal of Music Theory**, 18/1 (Spring 1974) pp. 75-90.

Lonnendonker, Hans: "Musiktheoretisches Grundstudium an der Musikhochschule des Saarlandes in Saarbrücken" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

Mackamul, Roland: "Effektivitätsmindernde Faktoren im Bereich der Gehörbildung" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

Messer, Wolfgang: "Musikalische Grundschulung an der Hochschule Graz" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

Müller-Bech Werner: "Anforderungen bei den Aufnahmeprüfungen der Musikhochschulen in der Bundesrepublik Deutschland bezogen auf die Musiktheorie und Gehörbildung" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

Naudé, Anna C.: **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987.

Paxinos, S.: "Examination Ear Tests" in **Musicus**, 15/1 (1987) pp. 14-21.

Pembrook, Randall G. and H. Lee Riggins: "'Send help!': Aural skills Instruction in U.S. Colleges and Universities" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 231-241.

Pratt, George and Michael Henson: "Aural Teaching in the First Year of Tertiary Education: An Outline for a Course" in **British Journal of Music Education**, 4/2 (1987) pp. 115-137.

Pratt, George, Michael Henson and Simon Cargill: **Aural Awareness: Principles and Practice.** Milton Keynes: Open University Press, 1990.

Rogers, Michael R.: "A Report on the 1992 CMS Theory Pedagogy Institute" in **Journal of Music Theory Pedagogy**, 6/2 (1992) pp. 35-41.
"Editorial: Trends and Issues in Music Theory Teaching" in **Journal of Music Theory Pedagogy**, 1/1 (Spring 1987) pp. 1-5.

Ward-Steinman, David: "Comprehensive Musicianship at San Diego State University" in **Journal of Music Theory Pedagogy**, 1/2 (Fall 1987) pp. 127-147.

Wennerstrom, Mary H.: "The Undergraduate Core Music Curriculum at Indiana University" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) pp. 153-176.

Wettstein, Peter: "Gehörbildungsunterricht an der Musikhochschule Zürich" in Josef Mayr-Kern (Ed.), **Materialien und Dokumente aus der Musikpädagogik, Band 6: Musikalische Grundschulung an Ausbildungsstätten für Musikberufe - Dokumentation über die D-A-CH-Tagung 1976.** Regensburg: Gustav Bosse, 1978.

Yao, Sher-Tzer: **The Aural Skills Development Program in Music Departments of Two Post-Secondary Institutions in Taiwan: Status and Recommendations.** Doctoral dissertation, Ball State University 1990. Ann Arbor, Michigan: University Microfilms International, 1990.

1.2 Traditional perspectives

1.2.1 *Programmed Aural Training (not CAT)*

Bodenstein, Nancy Marie: "The Teaching of Selected Musical Concepts in the College Music Survey Course utilizing the Taped Guided Listening Technique" in **Dissertation Abstracts International**, 36/3 (September 1975) p. 1362-A.

Bridges, Nicolas: "The Development of Aural Perception of Selected Percepts of Musical Form utilizing Programmed Instruction" in **Dissertation Abstracts International**, 43/4 (October 1982) pp. 1073-A - 1074 -A.

Carlsen, James C.: "Implications of Recent Research Problems in Programed Music Instruction" in **Bulletin of the Council for Research in Music Education**, 4 (Winter 1965) pp. 30-35. "Programmed Learning in Melodic Dictation" in **Journal of Research in Music Education**, 12/2 (1964) pp. 139-148.

Daniels, Melvin Lucas: "An Investigation of the Effectiveness of Programed Learning in the Teaching of Harmonic Dictation at a Beginning College Music Theory Course" in **Dissertation Abstracts International**, 26/11 (May 1966) pp. 6544-A - 6545-A.

Graves, David Lee: "The Development of an Objective Sight Singing Achievement Test Employing Electronic Measurement Apparatus" in **Dissertation Abstracts International**, 41/10 (April 1981) p. 4322-A.

Greenberg, Marvin and Don R. Huddleston: "A Program for Developing Aural Discrimination of Instrumental Tone Colors Using a Videosonic Teaching Machine" in **Journal of Research in Music Education**, 19/1 (1971) pp. 51-61.

Hammer, Harry: "An Experimental Study of the Use of the Tachistoscope in the Teaching of Sight Singing" in **Journal of Research in Music Education**, 11 (1963) pp. 44-54.

O'Connor, Sister Margaret Grace: "Development of Discriminatory Music Listening Skills in the Junior High School utilizing Programmed Instruction" in **Dissertation Abstracts International**, 37/3 (September 1976) p. 1446-A.

Sangster, P.A.: **Audio Psycho Phonology as Ear Training for Musicians to Improve their Aural Perception.** Unpublished essay presented for the degree of Bachelor of Music, University of Natal-Durban 1978.

Simpson, Edwin: "Investigating the Effectiveness of Programed Listening in Secondary Instrumental Music Instruction" in **Bulletin of the Council for Research in Music Education**, 19/4 (1970) pp. 17-19.

Tarratus, Edward A. (Jr.) and Charles L. Spohn: "Cooperative Research in Programed Learning: Taped Interval Discrimination Drills" in **Journal of Research in Music Education**, 15/3 (1967) pp. 210-214.

1.2.2 *Selected teaching strategies*

Davidson, Lyle, Larry Scripp and Joan Meyaard: "Sightsinging at New England Conservatory of Music" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 3-68.

Froseth, James O.: **A Longitudinal Study of the Relationship between Melodic Ear-to-Hand Coordination and Selected Indices of Music Achievement at The University of Michigan School of Music.** Research Report to the Dean and Executive Committee of the School of Music, The University of Michigan, Spring 1985. (As quoted by Michael David Wilder. The researcher received only excerpts from this report from James Froseth)

Haendschke, Theodore Alexander: **The Aural Recognition of Sonorities.** Unpublished Master's thesis, University of Texas, 1955.

Humphreys, Jere Thomas: "An Investigation of an Experimental Harmonic Audiation Skills Testing and Training Program for Instrumental Music Education Majors" in **Dissertation Abstracts International**, 45/2 (August 1984) pp. 446-A - 447-A.

Johnson, Greta J. Bredemeier: **A Descriptive Study of the Pitch-Reading Methods and the Amount of Time utilized to Teach Sight Singing by High School Choral Teachers in the North Central Region of the American Choral Directors Association.** Master's thesis, University of Nebraska 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

Karpinsky, Gary S.: "A Model for Music Perception and its Implications in Melodic Dictation" in **Journal of Music Theory Pedagogy**, 4/2 (Fall 1990) pp. 191-229.

Lochstampfor, Mark Lewis: "The effects of timbre on aural skills: An exploration of the attributes of timbre and spectral parsing for sounds used in aural training" in **Dissertation Abstracts International,** 51/12 (June 1991) p. 4054-A.

Luce, John R.: "Sight-Reading and Ear-Playing Abilities as Related to Instrumental Music Students" in **Journal of Research in Music Education**, 13/2 (Summer 1965) pp. 101-109.

Mason, Thom David: "The Case of Moveable Do. Solfège as a Practical Tool for Improvisors" in **Proceedings of NAJE Research**, (Since 1983 Jazz Research Papers) 7 (1987) pp. 95-107.

Murphy, Barbara Ann: "The Effect of Task Order and Function Pattern on Learning of Harmonic Dictation" in **Dissertation Abstracts International,** 50/12 (June 1990) p. 3882-A.

Osborne, Anne Marion: "The Interaction of Field Dependence/Independence, Instructional Methodology, and Achievement in Harmonic Dictation Skills" in **Dissertation Abstracts International**, 49/10 (April 1989) p. 2959-A.

Pepper, Pearl Jenchol: **Individualized Materials for Teaching Selected Components of Melody in the Primary School.** Doctoral dissertation, Columbia University Teachers College, 1980. Ann Arbor, Michigan: University Microfilms International, 1984.

Pottenger, Harold Paul: **An Analysis of Rhythm Reading Skill.** Doctoral dissertation, Indiana University, 1969. Ann Arbor, Michigan: University Microfilms International, 1984.

Potter, Gary: "Identifying Successful Dictation Strategies" in **Journal of Music Theory Pedagogy**, 4/1 (Spring 1990) pp. 63-71.

Roye, Nedra Koen: "Memory - A Comparison of Rote Rehearsal versus the Story Mnemonic for the Recognition, Identification, and Recall of Musical Intervals" in **Dissertation Abstracts International,** 48/1 (July 1987) p. 39-A.

Rush, Mark Alan: "An Experimental Investigation of the Effectiveness of Training on Absolute Pitch in Adult Musicians" in **Dissertation Abstracts International,** 50/4 (October 1989) p. 826-A.

Trusheim, William H.: "Mental Imagery and Musical Performance: An Inquiry into Imagery Use by Eminent Orchestral Brass Players in the United States" in **Dissertation Abstracts International,** 49/4 (October 1988) p. 655-A.

Wilder, Michael David: **An Investigation of the Relationship between Melodic Ear-to-Hand Coordination and Written and Aural Theory Skills within an Undergraduate Music Theory Context.** Doctoral dissertation, University of Michigan, 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Yeager, Marian Ruth: **A Survey of the Corrective Listening Ability of a Group of College Music Students.** Unpublished Master's thesis, University of Texas, 1952.

1.2.3 *Comparisons between selected methods*

Bales, W. Kenton and Roger E. Foltz: "A Comparison of Synthesized and Acoustic Sound Resources in Lower-Division Theory Courses" in **Journal of Music Theory Pedagogy**, 1/1 (Spring 1987) pp. 91-103.

Blombach, Ann K. and Regena T. Parrish: "Acquiring Aural Interval Identification Skills: Random vs Ordered Grouping" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 113-131.

Bridges, Nicolas: "The Development of Aural Perception of Selected Percepts of Musical Form utilizing Programmed Instruction" in **Dissertation Abstracts International**, 43/4 (October 1982) pp. 1073-A - 1074 -A.

Canelos, James J., Barbara A. Murphy, Ann K. Blombach, and William C. Heck: "Evaluation of Three Types of Instructional Strategy for Learner Acquisition of Intervals" in **Journal of Research in Music Education**, 28/4 (1980) pp. 243-249.

Crumpler, Sue E.: "The Effect of Dalcroze Eurhythmics on the Melodic Musical Growth of First Grade Students" in **Dissertation Abstracts International**, 43/8 (February 1983) p. 2587-A.

Gamble, Denise Kath: "A Study of the Effects of Two Types of Tonal Pattern Instruction on the Audiational and Performance Skills of First-Year Clarinet Students" in **Dissertation Abstracts International,** 50/4 (October 1989) pp. 893-A - 894-A.

Goodwin, Mark Allen: "The Effectiveness of 'Pitch Master' Compared to Traditional Classroom Methods in Teaching Sightsinging to College Music Students" in **Dissertation Abstracts International,** 52/1 (July 1991) p. 106-A.

Hewlett, Rex J.: **An Investigation of the Effectiveness of Two Methods of Student Response using Taped Program of Practice Materials for Improving Aural Discrimination.** Doctoral dissertation, Michigan State University 1966, as quoted by Michael David Wilder.

Hutton, Doris: "A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade" in **Journal of Research in Music Education**, 1 (Fall 1953) pp. 119-126.

Joseph, Annabelle Sachs: "A Dalcroze Eurhythmics Approach to Music Learning in Kindergarten through Rhythmic Movement, Ear-Training and Improvisation" in **Dissertation Abstracts International**, 44/2 (August 1983) p. 420-A.

Kadyk, Folkert Herpel: "A Comparison of Teaching Paired Beat Patterns in a Rhythm Content Learning Sequence with a Traditional Approach in Beginning Instrumental Music Classes" in **Dissertation Abstracts International**, 48/4 (October 1987) pp. 862-A - 863-A.

Kendall, Michael Jay: "The Effects of Visual Interventions on the Development of Aural and Instrumental Performance Skills in Beginning Fifth-Grade Instrumental Students: A Comparison of Two Instructional approaches" in **Dissertation Abstracts International,** 47/6 (December 1986) pp. 2070-A - 2071-A.

Levinowitz, Lili Muhler: "An Experimental Study of the Comparative Effects of Singing Songs with Words and without Words on Children in Kindergarten and in First Grade" in **Dissertation Abstracts International**, 48/4 (October 1987) p. 863-A.

Martin, Beverly Ann: **The Effect of Hand Signs, Verbal Tonal Syllables, and Letter Representations of Tonal Syllables on the Verbal and Symbolic Acquisition of Tonal Skills by First Grade Students.** Doctoral dissertation, University of Oklahoma 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

O'Brien, Wanda Teresa: "A Comparison of the use of Analytical Language with the use of a Combination of Figurative and Analytical Language and their Effects on Attitude and Conceptual Understanding of Music among Seventh-Grade Students" in **Dissertation Abstracts International**, 50/7 (January 1990) p. 1975-A.

Palmer, Mary H.: "Relative Effectiveness of Two Approaches to Rhythm Reading for Fourth-Grade Students" in **Journal of Research in Music Education**, 24/3 (1976) pp. 110-118.

Parker, Robert Clinton: "The Relative Effectiveness of the TAP system in Instruction in Sight Singing: An Experimental Study" in **Dissertation Abstracts International**, 41/1 (July 1980) p. 151-A.

Sears, Margaret Frances C.D.P.: "Musical Listening Skills, Insight and Visual-Auditory Perception: A Statistical Investigation of their Relationships" in **Dissertation Abstracts International**, 37/9 (March 1977) pp. 5673-A - 5673-A.

Smithee, Larry Gene: "The Effects of Two Methods of Teaching Basic Music Concepts utilizing Twentieth-Century Music" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1975-A - 1976-A.

Stockton, James Larry: "An Experimental Study of Two Approaches to the Development of Aural Meter Discrimination among Students in a College Introductory Class" in **Dissertation Abstracts International**, 43/3 (September 1982) p. 718-A.

1.3 Recent perspectives

1.3.1 *Computer-assisted Aural Training (CAT)*

Arenson, Michael: "An Examination of Computer-Based Educational Hardware at Twenty-Eight NCCBMI Member Schools" in **Journal of Computer-based Instruction**, 5/3 (1978) pp. 38-40.
"The Effect of a Competency-Based Computer Program on the Learning of Fundamental Skills in a Theory Course for Non-Majors" in **Journal of Computer-based Instruction**, 9/3 (1982) pp. 55-58.

Ashley, Richard Douglas: **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

Blais, F. and M. Prével: "The Melocapteur: A Pitch Extractor Peripheral Design for Ear Training", lecture read at the **Fourth Canadian Symposium on Instructional Technology: Computer Technologies for Productive Learning**. Winnipeg, Manhattan: National Research Council of Canada, 1983 pp. 515-518.

Blombach, Ann K. "OSU's GAMUT: Semi-Intelligent Computer-Assisted Music Ear Training", lecture read at the **Sixth International Conference on Computers and the Humanities.** Rockville, MD: Computer Science Press, 1983 pp. 14-15.

Bresler, Liora: "The Role of the Computer in a Music Theory Classroom: Integration, Barriers, and Learning" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1689-A.

Bukspan, Y., L.F. Lewis and B. Feinstein: "CAML - A Computer-Aided Music Learning Program" **The International Conference on Courseware Design.** Ramat, Gan, Israel: Processing Association Israel, 1988 pp. 304-308.

Conant, Barbara H.: **A study of Cognitive Processes of Children Creating Music in a Computer Learning Environment.** Doctoral dissertation, University of Massachusetts 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Dalby, Bruce Foreman: "A Computer-Based Training Program for the Development of Harmonic Intonation Discrimination Skill" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1974-A - 1975-A.

Daniel, Shirelle Desiree: **Computer-Assisted Instruction in Music Education.** Unpublished Honours Degree paper in Music Education, University of Natal-Durban 1989.

Deal, John Jeffrey: "Computer-Assisted Programed Instruction to Teach Pitch and Rhythm Error-Detection Skill to College Music Education Students" in **Dissertation Abstracts International**, 44/12 (June 1983) pp. 3622-A - 3623-A.

Eisele, Mark Joseph: "Development and Validation of a Computer-Assisted Instructional Lesson for Teaching Intonation Discrimination Skills to Violin and Viola students" in **Dissertation Abstracts International**, 46/12 (June 1986) p. 3642-A.

Gill, Michael James: **Zyklus: A Performer's Analysis; A Video Taped Timpani Method utilizing Computer Assisted Instruction for Ear Training.** Doctoral dissertation, University of Southern Mississippi 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Hofstetter, Fred T.: "Computer-Based Aural Training: The Guido system" in **Journal of Computer-based Instruction**, 7/3 (February 1981) pp. 84-92.
Computer Literacy for Musicians. Englewood Cliffs, N.J.: Prentice-Hall, 1988.

Humphries, James Avery: "The Effects of Computer-Assisted Aural Drill Time on Achievement in Musical Interval Identification" in **Dissertation Abstracts International**, 39/3 (1978) p. 1403-A, as well as in **Journal of Computer-based Instruction**, 6/3 (1980) pp. 91-98.

Hunter, Leslie L.: "Computer-Assisted Assessment of Melodic and Rhythmic Discrimination Skills" in **Journal of Music Theory Pedagogy**, 26/2 (1989) pp. 79-87.

Kolb, Randall Martin (reviewed by William R. Higgins): "Critiques: A Real-Time Microcomputer-Assisted System for Translating Aural, Monophonic Tones into Music Notation as an Aid in Sight-Singing" (Doctoral dissertation Louisiana State University 1984) in **Bulletin of the Council for Research in Music Education** 93 (Late summer 1987) pp. 49-52.

Konecky, Lawrence Wayne: "A Comparison of Two Sequences of Aural Interval Identification Drill Administered to College Students through Computer-Assisted Instruction" in **Dissertation Abstracts International,** 47/11 (May 1987) p. 4013-A.

Kozerski, Russell, A.: **Personal Computer Microworlds for Music Composition and Education.** University of California, San Diego 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Kuhn, Wolfgang E. and Raynold E. Allvin: "Computer-Assisted Teaching: A New Approach to Research in Music" in **Journal of Research in Music Education**, 15/4 (1967) pp. 305-315.

Lamb, M.R. and R.H.T. Bates: "Computerized Aural Training: An Interactive System Designed to Help both Teachers and Students" in **Journal of Computer-based Instruction**, 5/1+2 (1978) pp. 30-37.

Lorek Mary Jo: "Computer Analysis of Vocal Input: A Program that Simulates College Faculty Sight Singing Evaluation" in **Computer in Music Research**, 3 (Fall 1990) pp. 121-138.

Lorek, Mary Jo and Randall G. Pembrook: "Present and Future Applications of a Microcomputer-Based Frequency Analysis System" in **Psychomusicology**, 8/2 (1989) pp. 97-109.

Mee, Robert Arthur: "The Integration and Evaluation of 'Musicland' in a Music Listening Course and Acoustics Course for Tenth Grade Students" in **Dissertation Abstracts International,** 49/7 (January 1990) p. 1727-A.

Ottman, Robert W., Rosemary N. Killam, Robert M. Adams, W. Kenton Bales, Steven V. Bertsche, Leslie C. Gay, Donald B. Marshall, Daniel A. Peak, and Douglas Ray: "Development of a Concept-Centered Ear-Training CAI System" in **Journal of Computer-Based Instruction**, 6/3 (1980) pp. 79-86.

Pembrook, Randall G.: "Some Implications of Students' Attitudes Toward a Computer-Based Melodic Dictation Program" in **Journal of Research in Music Education**, 34/2 (1986) pp. 121-133.

Prével, Martin: "Low-Cost, Computer-Assisted Ear-Training" in **Journal of Computer-based Instruction**, 6/3 (1980) pp. 77-78.

Robinson, Russell Lowell: "The Development and Evaluation of Microcomputer-Assisted Music Instruction Program for the Improvement of Tonal Memory" in **Dissertation Abstracts International**, 45/4 (October 1984) pp. 1065-A - 1066-A.

Schaffer, John William: "Developing an Intelligent Music Tutorial: An Investigation of Expert Systems and their Potential for a Microcomputer-Based Instruction in Music Theory" in **Dissertation Abstracts International**, 49/10 (April 1989) p. 2959-A.

Thompson, Joseph Edgar: "Sightsinging Constant Rhythm Pitch Phrases: A Computer Assisted Instructional System" in **Dissertation Abstracts International**, 34/7 (January 1974) p. 4319-A.

Willett, Barbara E. and Anton J. Netusil: "Music Computer Drill and Learning Styles at the Fourth-Grade Level" in **Journal of Research in Music Education**, 37/3 (1989) pp. 219-229.

1.3.2 *Twentieth-century music*

Bester, Hilda: **Gehooropleiding in die Twintigste eeu met spesiale verwysing na Nuwe Musiek.** Unpublished Master's thesis, University of Stellenbosch 1983.

Marvin, Elizabeth West: **A Generalized Theory of Musical Contour: Its Application to melodic and Rhythmic Analysis of Non-Tonal Music and its Perceptual and Pedagogical Implications**. Doctoral dissertation, University of Rochester 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Rubinstein, Bat-sheva: "A Model for Developing Advanced Level Aural Cognition focussed on the Melodic Elements in Selected Twentieth Century Music" in **Dissertation Abstracts International,** 50/7 (January 1990) p. 1844-A.

Sears, Margaret Frances C.D.P.: "Musical Listening Skills, Insight and Visual-Auditory Perception: A Statistical Investigation of their Relationships" in **Dissertation Abstracts International**, 37/9 (March 1977) pp. 5673-A - 5673-A.

Smithee, Larry Gene: "The Effects of Two Methods of Teaching Basic Music Concepts utilizing Twentieth-Century Music" in **Dissertation Abstracts International**, 50/7 (January 1990) pp. 1975-A - 1976-A.

1.3.3 *Aural Analysis*

Brink, Emily Ruth: **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980.

Kaden, Christian: "Auditive Analyse: Kritik des Selbstverständlichen" in **Beiträge zur Musikwissenschaft,** 32/2 (1990) pp. 81-87.

Potter, Gary: "Putting Skills to Work: An Aural Analysis Project" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 69-84.

Thiele, Kerstin: "Möglichkeiten auditiver Analyse in der Arbeit mit Kindern. Eine Erkundigungs-untersuchung" in **Beiträge zur Musikwissenschaft,** 32/2 (1990) pp. 107-119.

1.4 Traditional and recent perspectives combined

1.4.1 *Comparisons between CAT and traditional approaches*

Garton, Janet Claire: "The Efficacy of Computer-Based and Tape-Recorded Assistance in Second-Semester Freshman Ear Training Instruction" in **Dissertation Abstracts International,** 42/11 (May 1982) pp. 4756-A - 4757-A.

Glass, Jacqualine Sherrie: "The Effects of a Microcomputer-Assisted Tuning Program on Junior High School Students' Pitch Discrimination and Pitch-Matching Abilities" in **Dissertation Abstracts International,** 47/6 (December 1986) p. 2070-A.

Lee, James Lawrence: "The Effectiveness of a Computer-Assisted Program designed to Teach Verbal-Descriptive Skills upon an Aural Sensation of Music" in **Dissertation Abstracts International**, 36/3 (September 1975) pp. 1363-A - 1364-A.

Shannon, Don Wayne: "Aural-Visual Interval Recognition in Music Instruction: A Comparison of a Computer-Assisted Approach and a Traditional In-Class Approach" in **Dissertation Abstracts International,** 43/3 (September 1982) p. 718-A.

1.4.2 *Effects and efficiency*

Bailey, Darrell Lee: "The Effects of Computer-Based Instruction on Achievement of Four, Five and Six-Year-Old Children in the Yamaha Music Education System Primary One Course" in **Dissertation Abstracts International**, 51/3 (September 1990) p. 777-A.

Bozone, John Michael: "The Use of Sight Singing as a Prestudy Aid for the Improvement of the Sight-Reading Skill of Second-Semester Class Piano Students" in **Dissertation Abstracts International,** 47/7 (January 1987) p. 2358-A.

Brown, Thomas Walker: "An Investigation of the Effectiveness of a Piano Course in Playing by Ear and Aural Skills Development for College Students" in **Dissertation Abstracts International**, 51/1 (June 1991) pp. 4052-A - 4053-A.

Dunlap, Michael Paul: "The Effects of Singing and Solmization Training on the Musical Achievement of Beginning Fifth-Grade Instrumental Students" in **Dissertation Abstracts International,** 51/2 (August 1990) pp. 444-A - 445-A.

Gamble, Denise Kath: "A Study of the Effects of Two Types of Tonal Pattern Instruction on the Audiational and Performance Skills of First-Year Clarinet Students" in **Dissertation Abstracts International,** 50/4 (October 1989) pp. 893-A - 894-A.

Grutzmacher, P.A.: "The Effect of Tonal Pattern Training on Aural Perception, Reading Recognition, and Melodic Sight Singing Achievement of First-Year Instrumental Music Students" in **Journal of Research in Music Education,** 35/3 (1987) pp. 171-181.

Hempel, Christoph and Andreas Lehmann: **TELG - Testreihe zur Ermittlung von Lernfortschritten in der Gehörbildung.** Pre-publication copy the authors' contribution to a panel discussion during the *KlangArt-Kongreß* held at the University of Osnabrück in 1991.

Hesser, Lois Annette: **Effectiveness of Computer Assisted Instruction in Developing Music Reading Skills at the Elementary Level.** Doctoral dissertation, State University of New York at Albany 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Karl, Harold Thomas: **The Effects of Melodic Dictation and Sight Singing on Music Reading Achievement.** Doctoral dissertation, Michigan State University 1971. Ann Arbor, Michigan: University Microfilms International, 1984.

King, Richard Vern: "The Effects of Computer-Assisted Music Instruction on Achievement of Seventh-Grade Students" in **Dissertation Abstracts International,** 49/9 (March 1989) pp. 2574-A - 2572-A.

Lewis, Barbara Emma: **The Effect of Movement-Based Instruction on the Aural Perception Skills of First- and Third-Graders.** Doctoral dissertation, Indiana University 1986. Ann Arbor, Michigan: University Microfilms International, 1986.

Rogers, Michael W.: "The Effects of Aural and Tactual Feedback on Sightreading Music at an Electronic Piano" in **Dissertation Abstracts International,** 51/2 (August 1990) p. 445-A.

Sanders, William Huston: **The Effect of Computer-Based Instructional Materials in a Program for Visual Diagnostic Skills Training of Instrumental Music Education Students.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1980. Ann Arbor, Michigan: University Microfilms International, 1980.

2. RELATED MUSIC PSYCHOLOGICAL ASPECTS

2.1 Aspects applied in Aural Training

Ashley, Richard Douglas: **Toward a Theory of Instruction in Aural Skills.** Doctoral dissertation, University of Illinois at Urbana-Champaign 1982. Ann Arbor, Michigan: University Microfilms International, 1982.

Bester, Hilda: **Gehooropleiding in die Twintigste Eeu met spesiale verwysing na Nuwe Musiek.** Unpublished Master's thesis, University of Stellenbosch 1983.

Brink, Emily Ruth: **A Cognitive Approach to the Teaching of Aural Skills viewed as Applied Music Theory.** Doctoral dissertation, Northwestern University Evanston, Illinois 1980. Ann Arbor, Michigan: University Microfilms International, 1980.

Conant, Barbara H.: **A study of Cognitive Processes of Children Creating Music in a Computer Learning Environment.** Doctoral dissertation, University of Massachusetts 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Davidson, Lyle, Larry Scripp and Joan Meyaard: "Sightsinging at New England Conservatory of Music" in **Journal of Music Theory Pedagogy,** 2/1 (Spring 1988) pp. 3-68.

Karpinsky, Gary S.: "A Model for Music Perception and its Implications in Melodic Dictation" in **Journal of Music Theory Pedagogy,** 4/2 (Fall 1990) pp. 191-229.

Lochstampfor, Mark Lewis: "The Effects of Timbre on Aural Skills: An Exploration of the Attributes of Timbre and Spectral Parsing for Sounds used in Aural Training" in **Dissertation Abstracts International,** 51/12 (June 1991) p. 4054-A.

Marvin, Elizabeth West: **A Generalized Theory of Musical Contour: Its Application to melodic and Rhythmic Analysis of Non-Tonal Music and its Perceptual and Pedagogical Implications.** Doctoral dissertation, University of Rochester 1988. Ann Arbor, Michigan: University Microfilms International, 1988.

Mason, Thom David: "The Case of Moveable Do. Solfège as a Practical Tool for Improvisors" in **Proceedings of NAJE Research,** (Since 1983 Jazz Research Papers) 7 (1987) pp. 95-107.

Naudé, Anna C.: **'n Ondersoek na die geskiktheid van sillabi vir gehoortoetse in gegradeerde musiekeksamens.** Unpublished Master's thesis, University of Stellenbosch 1987.

Rubinstein, Bat-sheva: "A Model for Developing Advanced Level Aural Cognition focussed on the Melodic Elements in Selected Twentieth Century Music" in **Dissertation Abstracts International,** 50/7 (January 1990) p. 1844-A.

Sangster, P.A.: **Audio Psycho Phonology as Ear Training for Musicians to Improve their Aural Perception.** Unpublished essay presented for the degree of Bachelor of Music, University of Natal-Durban 1978.

Schleuter, Stanley L.: **A Sound Approach to Teaching Instrumentalists - An Application of Content and Learning Sequence.** Kent, Ohio: Kent State University Press, 1984.

2.2 Unexplored aspects

2.2.1 *Aural perception*

Aiello, Rita, J.S. Tanaka and Wayne C. Winborne: "Listening to Mozart: Perceptual differences among musicians" in **Journal of Music Theory Pedagogy,** 4/2 (Fall 1990) pp. 269-293.

Burns, Mary Marguerite: **Aural Perception of Tonality in Avant Garde Music and its Relationship to Preference.** Doctoral dissertation, Florida State University, 1980. Ann Arbor, Michigan: University Microfilms International, 1984.

Campenni, Catherine Estelle: **Contour and Rhythm as Determinants of the Perceptual Organization of Complex Auditory Stimuli.** Doctoral dissertation, Adelphi University 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

Christopherson, Frank Dean: "The Integration of Pitch and Interval Perception in Tonal Melody" in **Dissertation Abstracts International,** 50/12 p. 3785-A.

Dowling, Jay W. and Dane L. Harwood: **Music Cognition.** New York: Academic Press, 1986.

Faltin, Peter: **Phänomenologie der musikalischen Form: Eine Experimentalpsychologische Untersuchung zur Wahrnehmung des musikalischen Materials und der musikalischen Syntax.** Wiesbaden: Franz Steiner, 1979.

Gibson, Don B.: "The Aural Perception of Nontraditional Chords in Selected Theoretical Relationships: A Computer-Generated Experiment" in **Journal of Research in Music Education,** 34/1 (1986) pp. 5-23.

Lake, William Eastman: **Melodic Perception and Cognition: The Influence of Tonality.** Doctoral dissertation, University of Michigan 1987. Ann Arbor, Michigan: University Microfilms International, 1987.

Miller, R.: "An Introduction to Multidimensional Scaling for the Study of Musical Perception" in **Bulletin of the Council for Research in Music Education** 102 (Fall 1989) pp. 60-73.

Pederson, Darhl and Pederson Nancy: "The Relationship between Pitch Recognition and Vocal Pitch Production in Sixth-Grade Students" in **Journal of Research in Music Education,** (Fall 1970) pp. 265-272.

Petzold, Robert G.: "Auditory Perception by Children" in **Journal of Research in Music Education,** 17/1 (Spring 1969) pp. 82-87.

Poppensieker, Karin: **Musikpädagogik - Forschung und Lehre, Band 23: Die Entwicklung musikalischer Wahrnemungsfähigkeit.** Mainz: Schott, 1986.

Rasch, R.A. and R. Plomp: "The Perception of Musical Tones" in Diana Deutsch (Ed.), **The Psychology of Music**. New York: Academic Press, 1982.

Weber, Robert J. and Suellen Brown: "Musical Imagery" in **Music Perception**, 3/4 (1986) pp. 411-426.

2.2.2 *Developmental research*

Abel-Struth, Sigrid: **Musikpädagogik - Forschung und Lehre, Band 15: Musikalische Hörfähigkeiten des Kindes.** Mainz: Schott, 1979.

Flohr, J.W.: "Short-Term Music Instruction and Young Children's Developmental Music Aptitude" in **Journal of Research in Music Education**, 29/3 (1983) pp. 219-223.

Geringer, John: "The Relationship of Pitch-Matching and Pitch Discrimination Abilities of Preschool and Fourth-Grade Students" in **Journal of Research in Music Education**, (Summer 1983) pp. 93-99.

Hargreaves, David J.: **The Developmental Psychology of Music.** Cambridge: Cambrigde University Press, 1986.

Imberty Michel: "Die Bedeutung zeitlicher Strukturen für die musikalische Entwicklung" in Günter Kleinen, (Ed.) **Musikpädagogische Forschung Band 5: Kind und Musik.** Laaber: Laaber, 1984, pp. 106-128.

Küntzel-Hansen, Margrit: "Musikhören mit Kindern im Elementarbereich" in Günter Kleinen, (Ed.) **Musikpädagogische Forschung Band 5: Kind und Musik.** Laaber: Laaber, 1984, pp. 170-177.

Lüdeke, Rudlof: "Die Entwicklung des musikalischen Hörens" in **Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle Wittenberg, Gesellschafts- und Sprachwissenschaftliche Reihe,** 9/1 (January 1962) pp. 15-20.

McDonald, Dorothy T. and Gene M. Simons: **Musical Growth and Development - Birth through Six.** New York: Schirmer Books, 1989.

Pahlen, Kurt: **Es gibt keine unmusikalischen Kinder! Die Entwicklung der natürlichen Musikalität in den ersten Lebensjahren oder eine echte musikalische Früherziehung.** Wiesbaden/Zürich: Orell Füssli, 1989.

Peery, Craig J. (Ed.): **Music and Child Development.** New York: Springer, 1987.

Pflederer-Zimmerman, Marilyn: "Music Development in Middle Childhood: A Summary of Selected Research Studies" in **Bulletin of the Council for Research in Music Education,** (Winter 1986) pp. 18-35.

Staleva, Lilijana Vitanova: "Development of Music Mentation in Children" in **Bulletin of the Council for Research in Music Education,** Spring-Summer 1981 pp. 86-91.

Taebel, Donald K.: "The Effect of Various Instructional Modes on Children's Performance of Music Concept Tasks" in **Journal of Research in Music Education**, 22 (Fall 1974) pp. 170-183.

Wieczerkowski, Wilhelm and Hans zur Oeveste: "Theoretische Grundzüge der Entwicklungspsychologie" in Günter Kleinen, (Ed.) **Musikpädagogische Forschung Band 5: Kind und Musik.** Laaber: Laaber, 1984, pp. 87-105.

2.2.3 *Learning processes*

Burroughs, G.E.R. and J.N. Morris: "Factors Involved in Learning a Simple Musical Theme" in **British Journal of Educational Psychology**, 32 (Feb. 1962) pp. 18-28.

Byrd, Audrey S.: **Pitch Learning and the Implications for Music Education.** Unpublished doctoral dissertation, Rhodes University 1976.

Clynes, Manfred: **Music, Mind, and Brain - The Neuropsychology of Music.** New York: Plenum Press, 1982.

DeNardo, Gregory F.: "An Assessment of Musical Cognitive Processes used by Children to Compare Phrase Types within a Song" in **Dissertation Abstracts International,** 50/2 (August 1989) pp. 380-A - 381-A.

Deutsch, Diana: "Grouping Mechanisms in Music" in Diana Deutsch (Ed.), **The Psychology of Music.** New York: Academic Press, 1982.

Gabrielsson, Alf: "Interplay between Analysis and Synthesis in Studies of Music Performance and Music Experience" in **Music Perception,** 3/1 (Fall 1985) pp. 59.

Gagné, Robert M.: **The Conditions of Learning.** New York: Holt, Rinehart and Winston, 1977.

Greer, R. Douglas: **Design for Music Learning.** New York: Teachers College Press, 1980.

Gruhn, Wilfried: **Wahrnehmen und Verstehen - Untersuchungen zum Verstehensbegriff in der Musik.** Wilhelmshaven: Florian Noetzel, 1989.

Hiranpradist, Barbara Ruth: **Formal Operational Thought as a Dimension of Music Listener Behavior.** Doctoral dissertation, Michigan State University 1986. Ann Arbor, Michigan: University Microfilms International, 1986.

Howell, Peter, Ian Cross and Robert West (Eds): **Musical Structure and Cognition.** London: Academic Press, 1985.

Laske, Otto E.: **Music, Memory, and Thought - Explorations in Cognitive Musicology.** Ann Arbor, Michigan: Published for The Music department University of Pittsburgh by University Microfilms International, 1977.

Long, P.A.: "Relationships between Pitch Memory in Short Melodies and Selected Factors" in **Journal of Research in Music Education,** 25/4 (1977) pp. 272-282.

Maggio, Mary-Claire Schaff: "A Multitrait-Multimethod Investigation of the Relationship between Music Memory and Spatial Memory" in **Dissertation Abstracts International,** 51/1 (July 1990) p. 16-A.

Meyer-Denkmann, Gertrud: "Wahrnehmungspsychologische und neurophysiologische Aspekte des Musiklernens" in Günter Kleinen, (Ed.) **Musikpädagogische Forschung Band 5: Kind und Musik.** Laaber: Laaber, 1984, pp. 151-169.

Moog, Helmut: "Über Eigenarten musikalischen Lernens: Ein Beitrag zu einer musikalischen Lerntheorie" in Günter Kleinen, (Ed.) **Musikpädagogische Forschung Band 5: Kind und Musik.** Laaber: Laaber, 1984, pp. 129-150.

Orbach, Yael: **The Effect of Auditory Discrimination on the Learning of Music Concepts.** Unpublished doctoral dissertation, University of Natal-Durban, 1984.

Pembrook, Randall G.: "The Effect of Vocalization on Melodic Memory Conservation" in **Journal of Music Education** 35/3 pp. 155-169.

Rötter, Günther: "Psychologische Aspekte analytischen Hörens" in Hermann J. Kaiser, (Ed.) **Musikpädagogische Forschung Band 7: Unterrichtsforschung.** Laaber: Laaber, 1986, pp. 267-283.

Rosenthal, David: "A Model for the Process of Listening to Simple Rhythms" in **Music Perception,** 6/3 (1989) pp. 315-328.

Schellenberg, Stephen and Randall S. Moore: "The Effect of Tonal-Rhythmic Context on Short-Term Memory of Rhythmic and Melodic Sequences" in **Bulletin of the Council for Research in Music Education,** (Fall 1985) pp. 207-217.

Serafine, Mary Louise: The Development of Cognition in Music" in **Bulletin of the Council for Research in Music Education,** (1983) pp. 1-14.

Shuler, Scott Corbin: **The Effects of Gordon's Learning Sequence Activities on Music Achievement.** Doctoral dissertation, University of Rochester 1986. Ann Arbor, Michigan: University Microfilms International, 1987.

Sloboda, John A.: **The Musical Mind: The Cognitive Psychology of Music.** Oxford Psychology Series No. 5. Oxford: Clarendon Press, 1985.

Taggart, Cynthia Crump: "An Investigation of the Hierarchical Nature of the Stages of Tonal Audiation" in **Dissertation Abstracts International,** 50/10 (April 1990) p. 3176-A.

Walsh, Stephen: "Musical Analysis: Hearing is Believing?" in **Music Perception**, 2/2 (Winter 1984) pp. 237-244.

Wolf, Thomas: "A Cognitive Model for Musical Sight-Reading" in **Journal of Psycholinguistic Research** 5/1 (January 1976) pp. 142-171.

2.2.4 *Phenomena such as perfect pitch, tone deafness and* chromesthesia

Barkowsky, John J.: "An Investigation into Pitch Identification Behavior of Absolute Pitch and Relative pitch subjects" in **Dissertation Abstracts International**, 48/7 (January 1988) p. 1688-A.

Heyde, Eva Marie: **Was ist absolutes Hören? Eine musikpsychologische Untersuchung.** München: Profil, 1987.

Naudé, Dion C.: **'n Ondersoek na die verskynsel wat algemeen as "toondoofheid" bekendstaan.** Unpublished Master's thesis, University of Stellenbosch 1986.

Rush, Mark Alan: "An Experimental Investigation of the Effectiveness of Training on Absolute Pitch in Adult Musicians" in **Dissertation Abstracts International,** 50/4 (October 1989) p. 826-A.

2.2.5 *Miscellaneous*

Biock, Hans-Reinhard: **Zur Intonationsbeurteilung kontextbezogener sukzessiver Intervalle.** Kölner Beiträge zur Musikforschung, Akustische Reihe Band 6. Regensburg: Gustav Bosse, 1975.

Ely, Mark Christopher: "The Effects of Timbre on Intonational Performance and Perception by College Performers of Selected Woodwind Instruments" in **Dissertation Abstracts International**, 49/9 (March 1989) p. 2442-A.

Enders, Bernd: **Studien zur Durchhörbarkeit und Intonationsbeurteilung von Akkorden.** Regensburg: Gustav Bosse, 1981.

Gembris, Heiner: "Situative Bedingungen und Effekte des Musikhörens" in Hermann J. Kaiser, (Ed.) **Musikpädagogische Forschung Band 7: Unterrichtsforschung.** Laaber: Laaber, 1986, pp. 253-266.

Hassler, Marianne: **Musikalisches Talent und räumliche Begabung.** Doctoral dissertation, Eberhard-Karls-University Tübingen, 1984. Tübingen: Bölk, 1984.

Love, Diana Bonham: **The Relationship of Tempo, Pattern Length, and Grade Level on the Recognition of Rhythm Patterns.** Doctoral dissertation, Virginia Polytechnic Institute and State University 1988. Ann Arbor, Michigan: University Microfilms International, 1989.

Rauchfleisch, Udo: **Mensch und Musik: Versuch eines Brückenschlags zwischen Psychologie und Musik.** Winterthur/Switzerland: Amadeus, 1986.

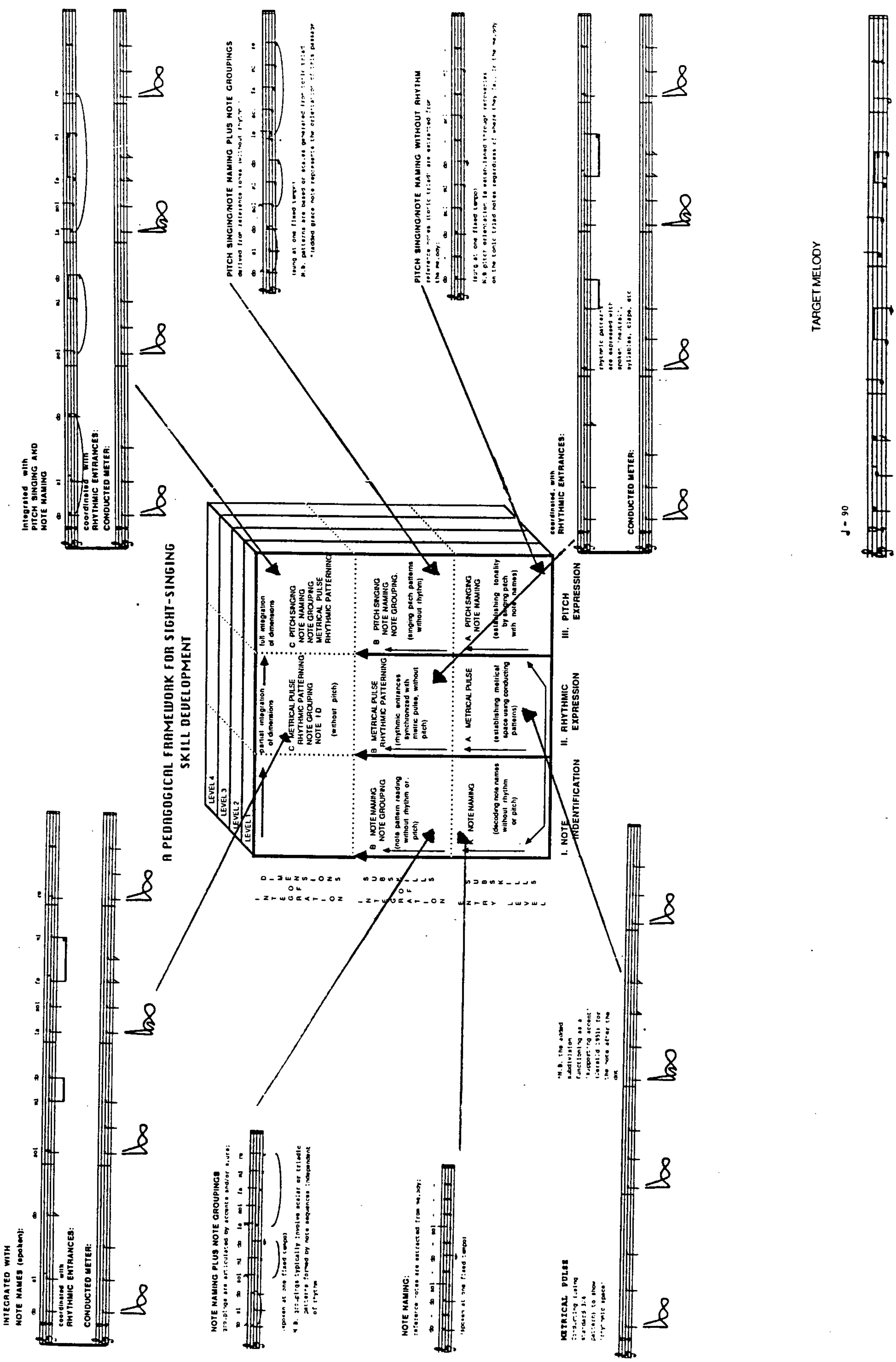
Riemann, Hugo: **Über das musikalische Hören.** Doctoral dissertation, University of Göttingen. Leipzig: Publisher unknown, 1874.

Sink, Patricia E.: "Effects of Rhythmic and Melodic Alterations and Selected Musical Experiences on Rhythmic Processing" in **Journal of Research in Music Education**, 32/3 (1984), pp. 177-193.

Warner, Theodor: **Das Undurchhörbare - Beiträge zur Hörpsychologie und Didaktik der Moderne.** Baden-Baden: Agis, 1969.

APPENDIX B

TARGET MELODY AND COMPONENT SKILLS SUGGESTED BY THE PEDAGOGICAL FRAMEWORK OF SCRIPP AND DAVIDSON



SIGHT SINGING LEVEL ONE (EARLY FIRST SEMESTER) AT THE NEW ENGLAND CONSERVATORY OF MUSIC

SIGHTSINGING LEVEL ONE (EARLY FIRST SEMESTER)

NOTE IDENTIFICATION (without rhythm or pitch)

A. MATERIALS: note reading with one clef (treble) reference; diatonic patterns by seconds, thirds, and fourths.

B. CRITERIA FOR OPERATIONALITY: stable visual orientation using a single clef reference and reference tones (e.g., c and g) within the clef; ability to perform scale patterns accurately derived from reference notes reading up or down, forwards or backwards.

C. EVIDENCE FOR INTERNALIZATION: Ability to visualize the clef reference without music; ability to track patterns without having to perform out loud; ability to perform extended note patterns filling in intervals without notation.

D. SUGGESTED TEXTS: any text can be used ignoring rhythm and pitch; Dandelot, *Manuel Pratique* is designed specifically to deal with this dimension in isolation and with carefully graduated materials.

RHYTHMIC EXPRESSION (with note names, without pitch)

A. MATERIALS: rhythms in simple meters (4/4, 3/4, 2/4); notes and rests explicitly coordinated with conducted beats and simple syncopations implied by "supporting accents" from conducted downbeats and simple subdivisions.

B. CRITERIA FOR OPERATIONALITY: ability to generate a precise conducting pattern in various tempos and meters; ability to coordinate note entrances with any beat of the conducting pattern at various tempos; ability to generate note entrances in between the conducted patterns (syncopation) at various and fluctuating tempos; alternating between performing rests and notes; articulating note patterns in performance independent of rhythmic patterns; ability to improvise rhythms maintaining meter and recovering later in the performance.

C. EVIDENCE FOR INTERNALIZATION: ability to conserve meter alternately conducting and not conducting; use of other body cues in place of the hand to express rhythmic entrances.

D. SUGGESTED TEXTS: for conducting, McElheran, *Conducting Technique;* rhythmic patterns in isolation and with note names; Jersild, *Ear Training* and Bona, *Rhythmical Articulation.*

PITCH EXPRESSION (with note names and rhythm)

A. MATERIALS: vocal warmup with scale, tonic (do, mi, sol) and "tension" or "cadential" (si, re, fa, la) chord patterns in one major key (e.g., C major); diatonic melodies in the one major key.

B. CRITERIA FOR OPERATIONALITY: ability to establish and reorient a stable memory tone reference (usually the tonic); ability to selectively perform the reference tones; ability to construct scale patterns freely filling in leaps or providing reference tone fluently (e.g., as grace-note ornaments to the music); construction of a fully operational tonal system derived from any scale degree initially given (in the key of C).

C. EVIDENCE FOR INTERNALIZATION: ability to predict errors by stopping *before* they occur; ability to silently follow a melody and jump in later in the piece; ability to establish a reasonable reference pitch without the piano.

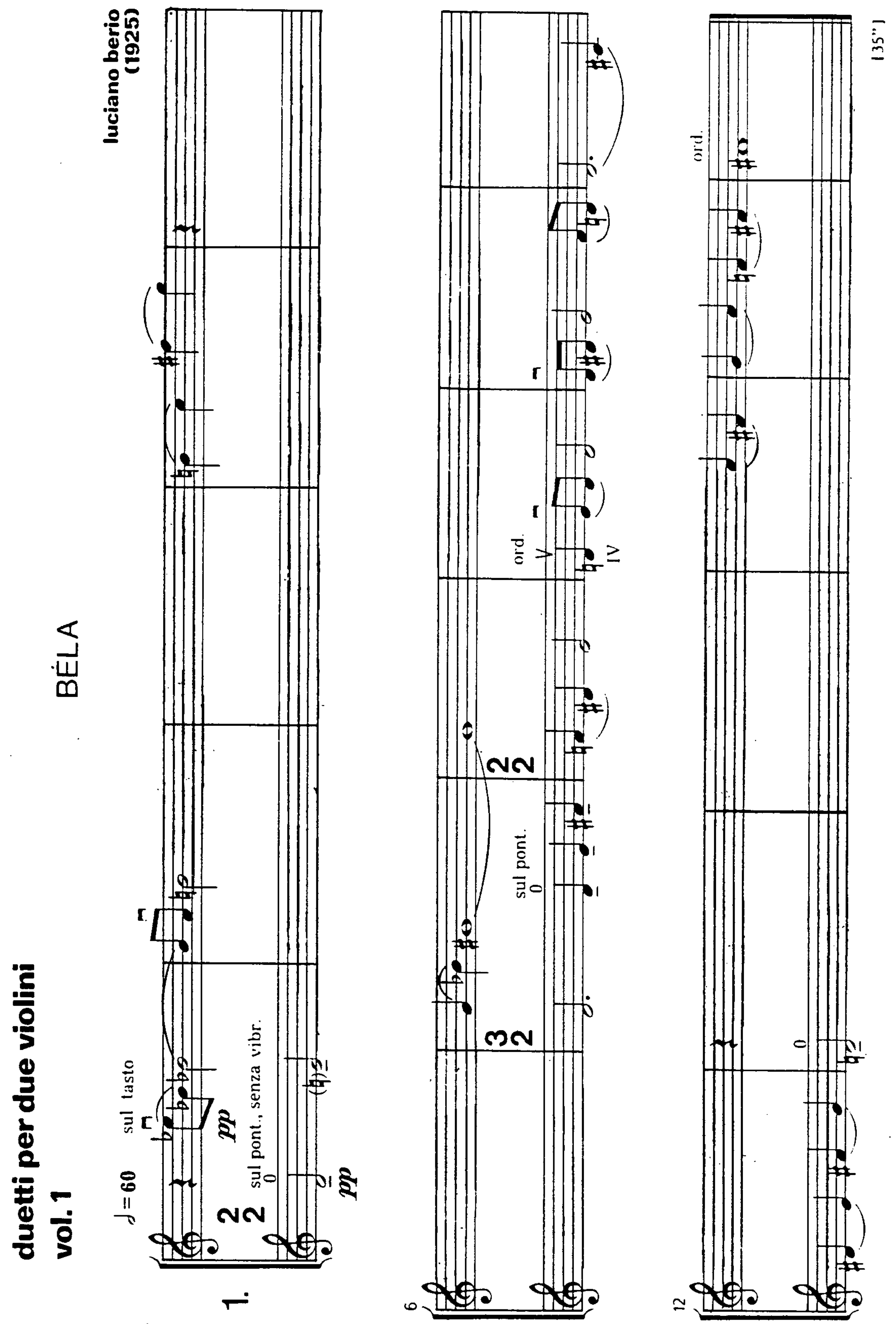
D. SUGGESTED TEXTS: Danhauser, *Solfege des Solfege*, vol. 1 (no. 1-77), LAZ, *Metodo Graduado De Solfeo* (no. 1-109); warmup exercises suggested by Ottman, *Music for Sight Singing* and Thomson, *Introduction to Music Reading.*

APPENDIX C

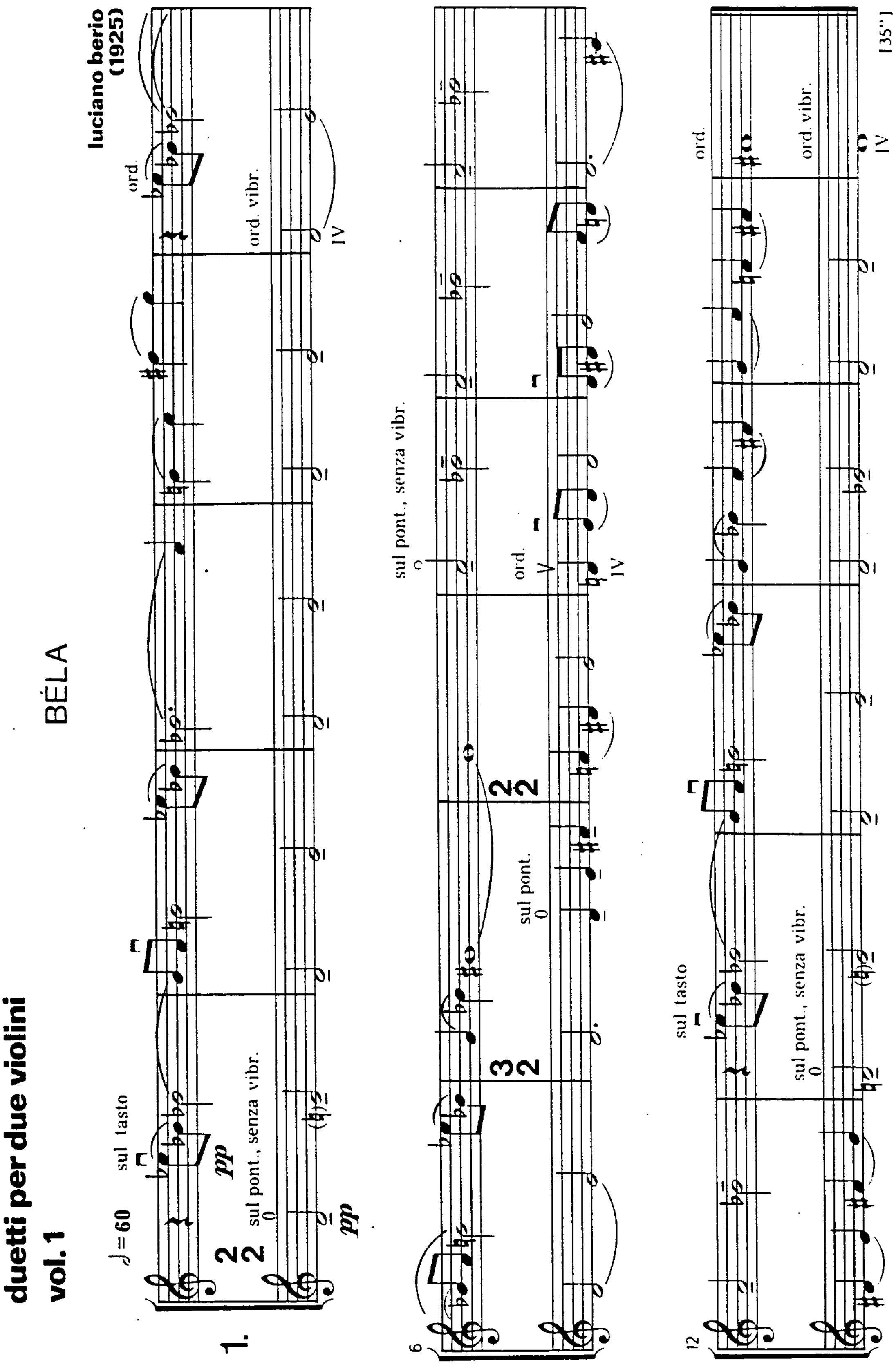
TWO EXAMPLES OF COMPLETION TASKS AS PRESENTED BY IRENE MATZ

duetti per due violini **luciano berio**
Vol. 1, Béla

Prepared score: The missing parts are to be dictated.



Original score



Dallam ködgomolyagban - Melody in the Mist **Béla Bartók**
from *Mikrokosmos IV, Nr. 107*

Prepared score: The missing parts are to be dictated or improvised vocally or instrumentally.

Melody in the Mist

Mélodie dans la brume Melodie im Nebelbrauen

Original score

Melody in the Mist

Mélodie dans la brume Melodie im Nebelbrauen

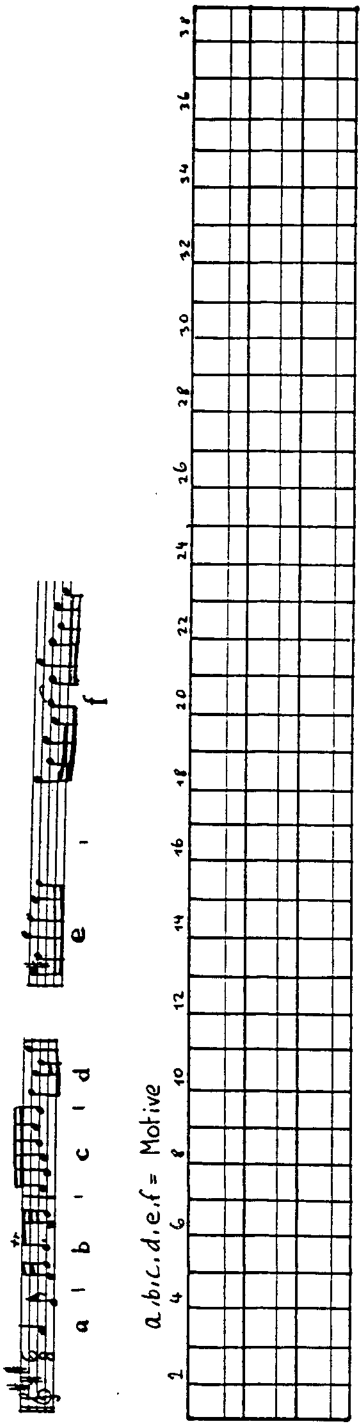
APPENDIX D

AURAL ANALYSIS CLASS BY HUBERT HAAS

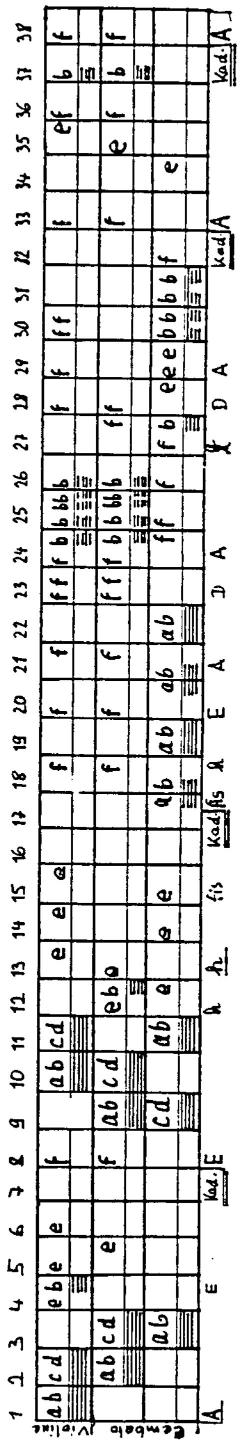
(Staatliche Hochschule für Musik und Darstellende Kunst)

The students had to listen to the first movement of the *Sonata Nr. 2 in A Major for violin and harpsichord (BWV 1015)*, by **J.S. Bach.** After a discussion on the general characteristics of the work, the following roster had to be completed after several hearings. In the roster the motivic overview of the sonata had to be given. The different motives appeared notated on the sheet of the roster (Example 1). The completed roster is presented in Example 2.

Example 1:



Example 2:



STUDENT'S AURAL ANALYSIS SEMINAR: SECOND VIENNESE SCHOOL

(Staatliche Hochschule für Musik und Darstellende Kunst)

Apart from the oral representation of his analysis in class, a student, Thomas Stöhr, also had to hand in a written copy of it. He analysed the first song from the *Fünf Lieder* (Op. 3) by **Anton Webern** in a combined aural and text analysis approach. Stöhr described his analysis in the four different listening phases presented below:

Impressions at the:

First hearing:

- very harmonious
- very colourful
- very expressive
- long breath
- Duration in minutes short, the psychological duration, however, longer
- Although sub-divisions are present, the effect that everything is under one phrase is created
- a kind of binary song form

Second hearing:

- lyrical
- hazy, like a picture in the mist
- entrance of the voice well prepared
- certain chords act timelessly but at the same time consolidating

Third hearing (while reading the score)

- the voice and the piano act independently in many ways, thus providing two perspectives:
  - (a) In the voice part a great density of the lyrical character is present;
  - (b) In the accompanying piano part a richness of sound colours is present.

- Bar 1: The opening chord "coheres" only after the following low note has sounded. This tone has a very expressive and colourful character. The opening has two meanings:
  - (a) The chord implies the immediate beginning of the piece.
  - (b) By means of the following low bass note the chord has a supportive character which prepares the entrance of the voice.

- Bar 2: The words *für dich* are emphasised as the epitome of the phrase, followed by a sort of repetition (answer).

- Bar 3: On the first beat (voice has a rest) dissonance becomes prominent.

- A comparison of bars 3 and 4:
  - Whole tone shifts appear in the voice.
  - Because of the dense melodic phrases the rhythmical structures do not receive much attention. (Referring to the triplets).

- Bar 5: The meaning of the rest and influence of the silence is important (rit/pp).

- Bar 6,7: One associates concepts such as timbre, mixtures and playfulness with each other. At the end of the 7th bar silence re-appears and it is experienced as a short "stop" in the music. Yet, at the same time the urge to continue is also present.

- Bar 8,9: Are heard in relation to bars 1-4 but with a different harmonization. A three-part song form is perceived (Recapitulation).

- Bar 10: As also mentioned in bar 5, the rest on the first beat is experienced as being very long.

- Bar 10/11: The phrase *das rühre sein* is answered in a metrically "shifted" way. The answer in the piano part is obviously prolonged through the tie.
A game with time and intensity is played until the last two notes die away.

Fourth hearing: general impression:

- The song develops in such a way that the impression arises as if no development in time exists.

- It reminds me of Béla Bartók's piece *Ballada - Ballade.*

- The score is limited to one page. This visual impression, however, does not correspond at all with the sound experience.

- The sound structure of the piece is extraordinarily rich in dissonance. The sound impression however is not that of traditional dissonance.

- Harmonically the piece is experienced as being beautiful and rich.

- The rhythmical structure of the piece is conspicuous. Triplets or other rhythms are not heard individually, but flow into one another.

- The character of the song at bars 6 and 7 is playful and childlike. The thirty-second notes create the impression of "pearls" played by a harp.

- Only now does it become clear to me how closely Webern tied himself to the text. For example, the word *Tränen* (bar 4) is repeated harmonically in bar 5. It, however, does not bother me at all that Webern used changed "tone material" (Tonmaterial).

- It is a musical arrangement of the voice material.

- The words *durch Morgengärten klingt es* (bar 6) are clarified through the use of many tones.

- The "surprise" chord in bars 7 and 8 triggers an emotion, but the following text is therefore less effective.

Final conclusions:

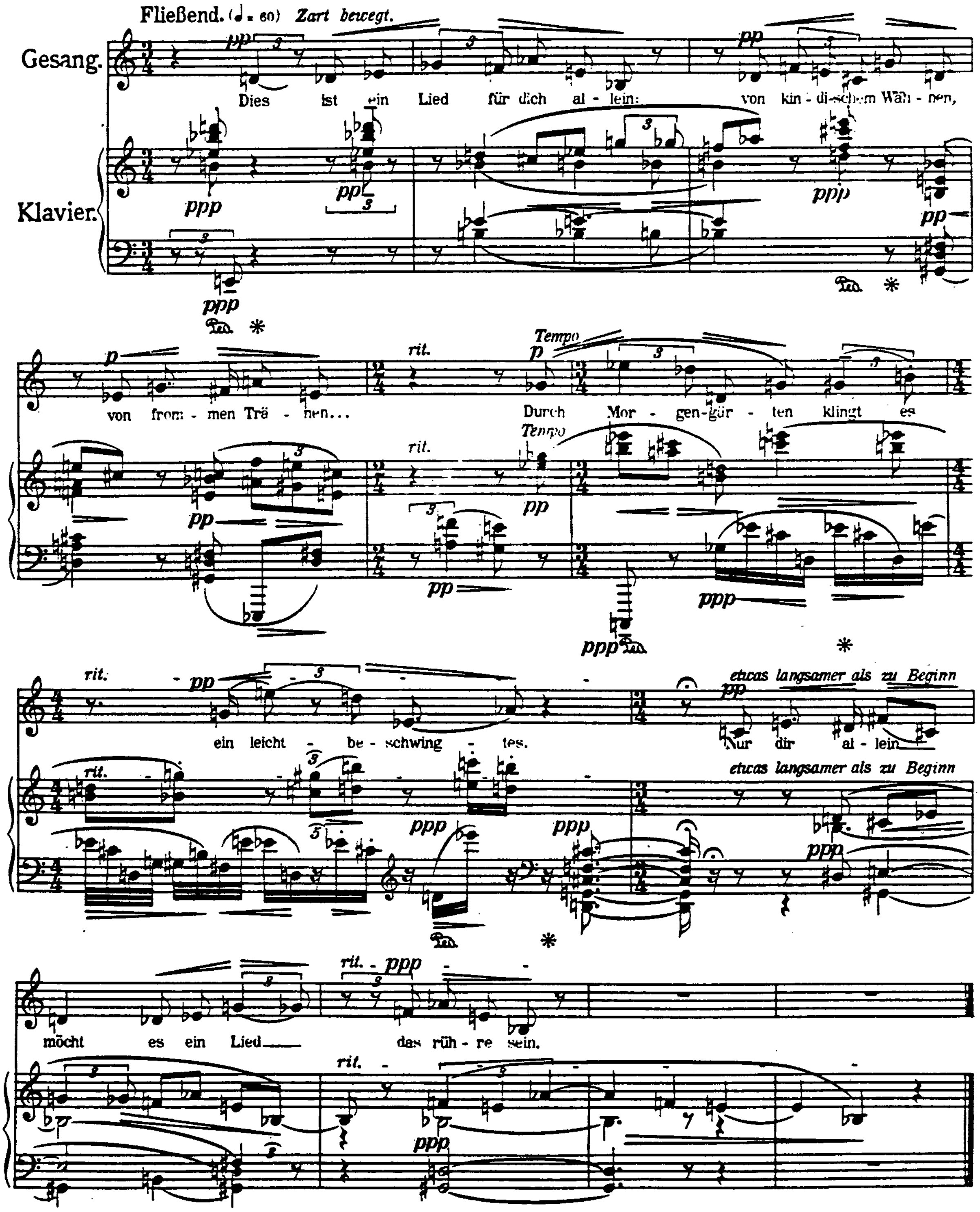
It is remarkable to what extent text and music quasi-integrate as timbre.

Through repeated listening it becomes clear that the issues involved here are VOICE - TIMBRE - SPACE - TIME. These components form a sort of "Gestalt" or structure of the song.

This is a piece that through its richness of expression through voice and sound material forces one to think. It needs all my attention and presence of mind when listening.

Fünf Lieder, Op. 3, I **Anton Webern**
from *Der siebente Ring* by Stefan George

I.



APPENDIX E

LIST OF AURAL TRAINING SOFTWARE

The following list of Aural Training software was compiled from many articles, books, catalogues, demonstration disks, directories, and specification sheets.[1] It does not claim to be a definitive directory of all commercially available software. Although composition and improvisation software can also be used for Aural Training purposes, these were not included in the list. The individual programs were not evaluated for the reasons given in Chapter One. Ratings and evaluations of several programs have been published by, for example, Barton K. Bartle, Bruce B. Campbell and Fred T. Hofstetter.[2]

The purpose of this list is to give an *overview* of commercially available Aural Training programs, and where possible, summary notes on the contents of the programs as well as reviews found on them are presented. Because of the rapid development of computers and software, however, it is possible that some of the software in the list has been replaced with newer versions or totally disappeared from the market.

The programs are discussed under the headings of *Contents, Level, Hardware requirements, Author(s)/programmer(s)* and *Distributor*. A dash (-) indicates that this specific point was not mentioned in any of the source literature.

A DECENT INTERVAL
Contents: Identify melodic/harmonic ascending/descending intervals either visually or aurally.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: James F. McCarthy
Distributor: Temporal Acuity Products

ADVANCED KEYBOARD TABULATOR
Contents: Apart from fundamental written theory knowledge on chords and different scales necessary for Jazz keyboard players, aural exercises are also included in this programme which makes use of an on-screen keyboard. Interval and chord recognition form the main components of the aural training part. Seventh chords are also included.
Level: (-)
Hardware requirements: Atari ST
Author: (-)
Distributor: Fröhlich, Marburg

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1 A list of all sources used appears at the end of this appendix. Notes and summaries taken from the different sources were combined in order to provide a more "detailed" overview.

2 Bruce B. Campbell, "Music Theory Software for the Macintosh" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 133-152.
Barton K. Bartle, **Computer Software in Music and Education: a guide.** London: Scarecrow, 1987.
Fred T. Hofstetter, **Computer Literacy for Musicians.** Englewood Cliffs, N.J.: Prentice Hall 1988.

AMADEUS
Contents: An intonation training system in which students' accuracy is evaluated by means of graded graphs. This information can be saved on disk for up to 66 students.[3]
Level: Elementary to Advanced
Hardware requirements: Apple II
Author: (-)
Distributor: Pyware

ARNOLD
Contents: A programme designed to teach *tone recognition* and *melodic memory skills*. Five levels of difficulty can be chosen from a library of ninety-five graded major mode melodies. The notes of a melody which increases in length are to be identified using either solfège syllables or scale degree numbers. It also contains a record-keeping feature.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: J. Timothy Kolosick
Distributor: Temporal Acuity Products

AUDIMAX
Contents: This programme consists of the following components: *Intervals* (e.g. choice between preferred and exclusive intervals: in the first choice one interval appears more often than the others, and in the second choice only up to three selected intervals are played), *punctual dictation* (a single tone is played by the user on the MIDI keyboard, followed by second computer generated tone which should be repeated by the student on the MIDI keyboard), *diatonic melodic dictation* (computer generated melodies or chosen from a library can be repeated on the keyboard, dictated on manuscript paper, sung from sight and compared with played example, etc.), *diatonic melodies with chromatic tones, chords* (identification of the highest and lowest tones, and quality of major, minor, diminished and augmented triads, six seventh chords), *diatonic melodic dictation with chromatic tones* and *rhythm* (determine/identify rhythms by choosing from a list of rhythmical structures, repetition of heard and sight reading (tapping) of seen rhythms. The accuracy of the played rhythm can be evaluated. Through looping techniques ostinato figures can be produced against which the student can play other rhythmical patterns. The creation of other more complex rhythmical exercises are also possible). Numerous pre-sets possible such as melodically/harmonically ascending/descending intervals, duration of tones, intensity, tempo, etc.
Level: Intermediate to Advanced
Hardware requirements: Atari ST, MIDI keyboard with four voices
Author: Christoph Hempel
Distributor: Musiklabor Ekkehard Arnold

AUDITE
Contents: The programme AUDITE was partly developed from an earlier programme called TONICA. It consists of *aural recognition of intervals* (second to octave), *development of written intervals skills* and *punctual, rhythmic and melodic dictation*. The teacher/user can add more melodies to the thirty existing dictation melodies. In the case of rhythmic dictation, no time signature appears at the beginning of the stave system, thus raising the possibility of "wrong" notation.
Level: Elementary to Advanced (according to the specification sheet not recommended for perfect pitch possessors and music professors)
Hardware requirements: IBM PC or compatible (512KB), EGA or Hercules graphic card, Roland MPU compatible MIDI interface and MIDI keyboard optional
Author: (-)
Distributor: WHC Musik-Software

AURA
Contents: Aural recognition of *intervals* (through naming or playing on the keyboard), *scales* (23 different scales), *chords* (29 different chords), *chord analysis*, *melodic tone series* (two to fourteen tones), *rhythm exercises* (values varying from wholes to sixteenth note triplets should be tapped/played on the MIDI keyboard, electronic percussion or computer keyboard) and "*auto lesson*". The parameters of the different exercises can be adjusted to a variety of the user's wishes. Stylistic criteria such as 'Classic', 'Pop', and 'Jazz' can, for instance, be selected in the case of chord recognition. In the "auto lesson" a series of different exercises can be pre-determined, and/or the teacher can create his own series of up to eighteen exercises. In such a setting the user first has to identify ten intervals, followed by ten

3 In a letter dated October 1991 the sales representative of Pyware informed the researcher that this programme was no longer available.

chords, five moderately difficult and five difficult Jazz chord recognition, ten scales, twelve rhythm exercises, etc. The teacher thus has the ability to compile his own exercises and quizzes for a practice session.
Level: Elementary to Advanced
Hardware requirements: Atari ST, MIDI keyboard, keyboard with more than five voices recommended
Author: Clemens Homburg
Distributor: C-LAB

AURAL ABILITY PERCEPTION
Contents: Four year sequence of ear training.
Level: Advanced
Hardware requirements: Apple II series
Author: (-)
Distributor: Stetson University

AURAL SKILLS TRAINER
Contents: Aural Skills Trainer is designed to improve a music student's ability to perceive and identify randomly generated *intervals*, (ascending and descending), *basic triads* (root position or inversion), and *seventh chords* (dominant seventh chord in root position and inversions, other chords in root position only.) Student records are kept and can be printed. Each one of the three components (intervals, basic chords and seventh chords) can be bought separately or in a complete set.
Level: Intermediate to Advanced
Hardware requirements: Apple II, Atari ST, Commodore-64/128, IBM PC or compatible, Macintosh Plus or greater, Yamaha C-1
Author: Vincent Oddo
Distributor: Electronic Courseware Systems

BASIC EAR TRAINING SKILLS
Contents: A set of four programmes for aural pitch discrimination, melodic intervals, aural chords and aural scales.
Level: (-)
Hardware requirements: Apple II series, ALF MC16
Author: (-)
Distributor: Alf Products

BASIC MUSICIANSHIP
Contents: An integrated written and aural introduction to music fundamentals. A textbook plus 43 instruction programmes are used. In one of the Aural Training programmes *Melody Game* students, for example, have to respond to short melodies by choosing one of three contours in line notation. In some other programmes rhythmic patterns should be tapped on the slash-key and intervals aurally identified.
Level: Advanced
Hardware requirements: Apple II, IIe, IIc
Author: Raynold L. Allvin
Distributor: Wadsworth Publishing Company

BASIC MUSICIANSHIP SKILLS II
Contents: BASIC MUSICIANSHIP SKILLS I concentrates merely on written theory skills, whereas II is a melodic dictation drill encompassing fifteen units. The first level contains dictating single pitches and the fourth level seven-note melodies. Pitch material is taken from tonic triad pitches, any note of the major or harmonic scale. Answering takes place by moving a cursor up and down (a) a list of scale degrees of solfeggio syllables, (b) a stave with a key signature, (c) a stave without a key signature. Students can customize their own units by specifying the length, response mode, clef, etc.
Level: Intermediate to Advanced (Four difficulty levels)
Hardware requirements: Apple II
Authors: Allen Winold, John William Schaffer, Chris Payne, Susan Tepping
Distributor: Indiana University Audio Visual Center

BEGINNING AND INTERMEDIATE MUSIC THEORY
Contents: Ear-training and written theory lessons.
Level: (-)
Hardware requirements: Apple II series, DAC board
Author: (-)
Distributor: University of Kentucky

CAMUS: MELODIC DICTATIONS
Contents: A four-disk set of melodic dictation drills including simple diatonic, chromatic, modulating and atonal melodies. Teachers can use the *CAMUS Authoring system* to write their own melodic dictation exercises to accompany this programme.[4]
Level: Intermediate to Advanced
Hardware requirements: Apple II, IBM PC or compatible
Authors: Colette Jousse Wilkins, Richard Stern
Distributor: Conduit

COMPUTER ASSISTED EAR TRAINING FOR BAND
Contents: Solfège Tutorial to be used in conjunction with *Book 1* of *The Comprehensive Music Instructor for Band*, and accompanying audio cassettes titled *Solfège Training and Intonation Studies*. It consists of computer-generated solfège exercises for developing singing skills, pitch discrimination, and the ability to associate melodic syllables with the sound of melodic patterns in major and minor tonality.
Level: Intermediate
Hardware requirements: Apple II
Author: James O. Froseth
Distributor: Music Learning Resources

COMPUTER ASSISTED EAR TRAINING FOR RECORDER
Contents: As above but to be used in conjunction with *Book 1* of *The Comprehensive Music Instructor for Recorder* and accompanying audio cassettes titled *Solfège training and Intonation Studies*.
Level: Intermediate
Hardware requirements: Apple II
Author: James O. Froseth
Distributor: Music Learning Resources

COMPUTERKOLLEG
Contents: The programme consists of four training components: *Intervals* (melodically and harmonically played intervals, ascending/descending or both, are drilled and evaluated), *Scales* (major, minor, modal, gipsy-major, gipsy-minor, pentatonic, wholetone), *Rhythms* (See five, hear one, hear five, see one, recognition of folk-song rhythms, dictation by selecting patterns from a list of rhythmic structures) and *Chords* (recognition of individual chord recognition, Jazz chords, chained chords where one tone is fixed and different chords are built on and around this tone). Each of the four components has a tutorial, pre-practise session and one or two main parts. Student records available. The difficulty level is automatically chosen by the programme according to the age of the student. This feature cannot be eliminated by the user, which can be problematic for a more advanced student who would like to review more elementary material.
Level: Elementary to Advanced
Hardware requirements: Atari ST, MIDI keyboard recommended
Authors: Bernd Enders, M. Schutte, Kai Schwirzke
Distributor: Schott

CHORD MANIA
Contents: Aural/visual identification of four-voice chords in any combination of qualities. The "beat-the-clock" game technique is used and drill sessions can be tailored to a unique set of drill patterns by the user.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: David B. Williams, Julie Schulze, David L. Shrader
Distributor: Temporal Acuity Products

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4 In a letter dated October 1991 the sales representative of Conduit informed the researcher that *Melodic Dictations* was no longer available.

CHORDELIA
Contents: The hearing of the quality of triads and seventh chords and spelling them on the stave are developed. Although students choose a level of difficulty, this level is automatically adjusted to the student's performance. Students can control the inversion, open and close position. Student records available.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Abram M. Plum
Distributor: Temporal Acuity Products

COUNT-ME-OUT
Contents: Two measure phrases are displayed on the screen and the student has to type the appropriate counting syllable beneath each note.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: David J. Otterson
Distributor: Temporal Acuity Products

DAS OHR/THE EAR
Contents: *Intervals*, (indication of the largest of two melodically or harmonically played intervals) *scales*, (aural identification of major, minor, chromatic, whole tone scales and church modi) *chords* (major, minor, diminished and augmented triads, several seventh chords) and randomly generated *dictation* (a series of eight to twenty tones should be notated on manuscript paper.) Student has limited control over interval sizes, selection of scales, tempo, chord inversion, length of dictation.
Level: Intermediate to Advanced
Hardware requirements: Atari ST, MIDI keyboard with at least four or five voices
Author: (-)
Distributor: Steinberg

DIATONIC CHORDS
Contents: Harmonic dictation of a four-voice six-chord progression. The bass line is to be notated first, followed by the soprano line. The chord functions and inversions should then be identified. Primary triads, first and second inversion triad, dominant sevenths and secondary triads are covered. Typing on the letters of the keyboard is used as input mode.
Level: Intermediate
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: James F. McCarthy, Donald Para
Distributor: Temporal Acuity Products

DICTATION
Contents: Elementary music theory to teach aural tone direction: Same, up or down.
Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: S & K Associates

DOREMI
Contents: Aural identification of the individual notes of short four-note diatonic groups using solfège responses.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Bruce Benward, David B. Williams
Distributor: Temporal Acuity Products

EAR CHALLENGER
Contents: Ear Challenger is an aural-visual music game designed to increase pitch memory of a series of pitches played. The different pitches are reinforced with contrasting colors. Report of student progress available.
Level: Elementary - Intermediate (Seven difficulty levels based on the number of pitches presented)
Hardware requirements: Apple II, Commodore-64/128
Authors: Chris Alix, Steve Walker
Distributor: Electronic Courseware Systems

EAR MASTER!
Contents: Consists of fourteen scored and paced activities that range from "Hi-Lo" games to melodic dictation. By means of a "free-form play" the activities or composition of short pieces can be drawn on screen and played to the MIDI instrument.
Level: Elementary to Advanced
Hardware requirements: IBM PC or compatible, VGA/EGA/Hercules/CGA supported. MIDI interface and keyboard recommended.
Author: (-)
Distributor: Upbeat Software

EAR-TRAINING EXPERT
Contents: The term *softext* is used to illustrate that software and a textbook/workbook are combined. The main pedagogical material is found in two separate programmes *Tutor* and *Drills*. The former includes aural exercises in major/minor pentatonic, whole tone and chromatic scales and church modes. The length and tempo of the exercises can be chosen by the user. The latter programme is an identification programme for scales, intervals, triads and seventh chords.
Level: Elementary to Intermediate
Hardware requirements: Macintosh
Author: (-)
Distributor: Techno Arts

EARLY MUSIC SKILLS
Contents: Tutorial and drill programme covering basic reading skills as well as the visual and aural identification of direction in which notes move, steps and skips in connection with traditional notation.
Level: Elementary
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Macintosh, Yamaha C-1, versions available with or without MIDI
Author: Lolita Walker Gilkes
Distributor: Electronic Courseware Systems

ECHO
Contents: An aural memory game where students repeat ("replay") the heard melody.
Level: (-)
Hardware requirements: Apple II
Author: (-)
Distributor: Programmer International

ETDRILL
Contents: Six different Aural Training drills are included in this programme which is developed for entering graduate students who do not pass the Aural Training entrance test: *Interval drill* (identification of melodic/harmonic played intervals; the user can respond on the synthesizer or the typewriter keyset), *Pitch pattern drill* (playing back of short pitch patterns on the synthesizer or by entering scale degree numbers on the typewriter keyset), *Melodic dictation drill* (entire heard melodies should be played back on the synthesizer for evaluation or should be notated on manuscript paper), *Isolated sonority drill* (triads and seventh chords should be identified by typing the chord quality on the keyset), *Chord pattern drill* (three types of chord patterns are played and should be identified: (a) cadential patterns with tonic, subdominant and dominant class chords, (b) three-chord secondary dominant patterns, (c) one to seven chords including Neapolitan and augmented sixth chords) and *Harmonic progression drill* (complete chord progressions of varying difficulty). In each of the drills the programme setting can be changed.
Level: Intermediate
Hardware requirements: IBM PC or compatible with at least an 80286 processor, EGA/VGA/Hercules driver, MIDI computer card and keyboard
Authors: Gary E. Wittlich, Eric Isaacson, Wayne Huck
Distributor: Indiana University School of Music

FOUNDATIONS OF MUSIC: A COMPUTER-ASSISTED INTRODUCTION
Contents: In this integrated approach a textbook and computer programme are combined in order to teach music fundamentals as a comprehensive course of study. Along with written theory concepts aural exercises are also included. Displayed rhythms should be tapped on the keyboard.

Level: Intermediate to Advanced
Hardware requirements: Any Apple II
Authors: Robert Nelson, Carl J. Christensen
Distributor: Wadsworth Publishing Company

GUIDO
Contents: GUIDO consists of six main programmes: *Intervals* (27 units: heard intervals should be named or played on the keyboard), *Melodies* (32 units: melodic dictation by using either pitch names, solfeggio syllables, scale degree numbers or piano keys), *Chord Qualities* (57 units: quality identification of major to thirteenth chords played in different styles), *Harmonies* (34 units, four-part dictation in choral style: unless the order is changed by the instructor, the bass should be notated first, Roman numerals added followed by entering the soprano), *Rhythms* (40 units, rhythmic dictation), *Rhythmic Melodies* (33 units, dictation: combines elements of rhythms and melodies lessons). In several control boxes aspects of the intervals, melodies, etc. to be generated can be changed. Students can, for example, choose whether the interval should played harmonically or melodically, ascending or descending, how long the notes should sound, etc, in what tempo the dictation melodies should be played, the register of the keyboard, the inversion of the chords, blocked or arpeggiated chords, isolating one voice in the harmony exercise by changing the volume of each line, setting a metronome for the rhythm exercises, etc. Student records available.
Level: Intermediate to Advanced
Hardware requirements: IBM PC, XT, AT, PS/2 or compatibles, Macintosh, IBM colour/graphics adaptor, RGB monitor, mouse. UD sound card, MIDI interface and keyboard or IBM music Feature recommended
Author: Fred. T. Hofstetter
Distributor: University of Delaware

HARMONIOUS DICTATOR
Contents: Aural recognition of chord progressions using roman numeral response, starting with simple tonic/dominant patterns and moving through all diatonic chords, selected seventh chords and secondary chords with inversions. The difficulty level can be set by the student or by the computer which automatically adjusts to the individual's skill level. A summary of the student's progression is provided.
Level: Intermediate to Advanced (Nine difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: J. Timothy Kolosick, David B. Williams
Distributor: Temporal Acuity Products

HARMONY
Contents: Pre-sequenced excerpts ranging from simple diatonic harmonies to chromatic modulation should be notated. The outer voices should be notated first, followed by identifying the chord by traditional alphanumeric chord symbols. A playback feature enables the hearing of the full pattern or just the outer parts.
Level: Intermediate to Advanced (Sixteen difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Dennis Bowers, David Mancini, Norman Wick
Distributor: Temporal Acuity Products

HARMONY DRILLS
Contents: Aural recognition of diationic chord progressions ranging from simple tonic/dominant root position chords to all diatonic chords in root and first inversions, and tonic chords in second inversion. The roman numeral system is used and students have the option of seeing the correct answer in stave notation. This programme may be used as a supplement to the book *Ear Training, a Technique for Listening* published by William C. Brown.
Level: Intermediate (Five difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Bruce Benward, J. Timothy Kolosick
Distributor: Temporal Acuity Products

HEAR TODAY...PLAY TOMORROW
Contents: Designed to improve aural/visual reading skills in combination with Aural Training, the programme consists of individual programmes that can be purchased either individually or in a complete set. The following are included: Three melody lines from familiar music are shown in *Find that tune*. The played melody must be correctly identified. In *Ear training skills* the user must identify and notate intervals or simple melodies produced by the computer. Two levels of *Melodic dictation* exist. At the beginner level complete portions of familiar melodies should be completed by filling in the missing notes. More complex melodies to be completed are presented at the intermediate level. In *Descending/ascending intervals* the user identifies and notates intervals played by the computer. *The Keyboard tasks cards* teach music reading by numbers in order to learn interval relationship and

correlate sight and sound. The counting of rhythm is taught by *The Keyboard rhythm task cards* in which questions on a worksheet should be answered and the melodies on the cards played. All exercises have varying difficulty levels and retain student records.
Level: Intermediate to Advanced
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Yamaha C-1
Author: Penny Pursell
Distributor: Electronic Courseware Systems

HEARING MELODIC PATTERNS
Contents: Hear and identify randomly selected melodic patterns of five to nine notes in major or minor keys by notating them on the on-screen stave. Student can choose length of patterns, key(s) and clef(s).
Level: Intermediate to Advanced (Ten difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Abram Plum
Distributor: Temporal Acuity Products

INNER HEARING
Contents: Melodic dictation programme based on familiar folk melodies. Notation on screen should be adjusted to match the heard melodic phrase (beginning note given). A unique inner hearing drill provides students with the opportunity to imagine and/or sing every other measure of the completed exercise. Tone sets are based on Kodály principles, becoming gradually more complex. Work report available.
Level: (-)
Hardware requirements: Macintosh plus or greater, MIDI interface and synthesizer, headphones or sound system to make synthesizer audible
Author: (-)
Distributor: Temporal Acuity Products

INTERVAL DRILLMASTER
Contents: Interval construction, notation and aural identification of intervals.
Level: Advanced (22 difficult levels)
Hardware requirements: Apple II, II+, ALF synthesizer board recommended
Author: Gerald W. Chastain Jr.
Distributor: Conduit

INTERVAL MANIA
Contents: Basic drill in aural/visual identification of melodic and harmonic intervals in a "beat-the-clock" game format. Any or all combinations of interval sizes and qualities within an octave are provided on the treble, bass or full great stave.
Level: Intermediate to Advanced (3 difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: David B. Williams, Julie Schulze, David L. Shrader
Distributor: Temporal Acuity Products

JAZZ DICTATOR
Contents: It is the advanced partner of HARMONIOUS DICTATOR and drills aural identification of jazz chord progressions using roman numeral responses.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: J. Timothy Kolosick, David B. Williams, Dan Haerle
Distributor: Temporal Acuity Products

JUST BETWEEN THE NOTES
Contents: Aural/visual interval identification in three sections: *Staff Works* (visual identification), *Ear Trainer* (aural identification) and *Professor* (complete study course).
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Joseph Shufro
Distributor: Temporal Acuity Products

KEYBOARD CHORDS-MIDI
Contents: Tutorial, chord spelling drill, keyboard drill (aural recognition by playing notes on keyboard) and a test on simple chords such as major, minor, diminished and augmented chords. Inversion and clef can be controlled by the user.
Level: Elementary to Intermediate
Hardware requirements: Apple II, Atari ST, Commodore-64/128, IBM PC or compatible, Yamaha C-1, MIDI interface and keyboard
Author: G. David Peters
Distributor: Electronic Courseware Systems

KEYBOARD JAZZ HARMONIES-MIDI
Contents: It is designed to teach chord symbols, seventh chord recognition and chord spelling, and consists of a tutorial, four drills, four quizzes, and a final quiz. In the final quiz an excerpt from a jazz tune is played and the student has to provide the chord symbol for each chord change as well as spelling the chord by playing it on the MIDI keyboard.
Level: Intermediate to Advanced
Hardware requirements: Apple II, Atari ST, Commodore-64/128, IBM PC or compatible, Macintosh Plus or greater, Yamaha C-1, MIDI interface and keyboard
Author: Joe Brownlee
Distributor: Electronic Courseware Systems

KEYBOARD JAZZ HARMONIES-MIDI (EXTENDED COURSE)
Contents: This programme is the sequel to KEYBOARD JAZZ HARMONIES and is designed to teach students to identify and build ninth, eleventh and thirteenth chords. The tutorial presents an option to hear each chord played. The four sections included in the lesson are *Visual Chord Recognition, Aural Chord Recognition, Chord Symbol Drill*, and *Chord Spelling Drill*. By means of student records the progress of the students can be monitored by the instructor.
Level: Intermediate to Advanced
Hardware requirements: Apple II, Atari ST, Commodore-64/128, IBM PC or compatible, Macintosh Plus or greater, Yamaha C-1, MIDI interface and keyboard
Author: Joe Brownlee
Distributor: Electronic Courseware Systems

LISTEN 2.1
Contents: The programme consists of single notes intended for learning perfect pitch, two-note melodies, melodic sequences of user-determined length, the growing melody exercise designed for stretching memory skills, interval recognition, triads, seventh chords of all types, ninth, eleventh, and thirteenth chords, random atonal chords, tuning up, multiple-choice identification. Displays are available in staff, piano keyboard and guitar fretboard. A little "hand" shows the user that the answer should be played either on the on-screen instrument or MIDI instrument. The user can control many aspects of the programme such as key signatures, choosing between fourteen scales/modes, setting the pitch range, melody length and many more. A Beat-the-Timer option makes it possible to set the time limit before the next example is played.
Level: Middle School - Advanced (Five pre-set levels of difficulty or user-changeable level of difficulty)
Hardware requirements: Macintosh Plus or greater, standard MIDI interface and keyboard optional
Author: (-)
Distributor: Imaja

LISTEN! A MUSIC SKILLS PROGRAM
Contents: Three lessons were designed to help increase the user's ability to perceive and identify intervals, basic chords and seventh chords. Each lesson reinforces learning by displaying the correct answer when an incorrect answer is given. A score page offers feedback on knowledge of these basic skills.
Level: Middle School
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Yamaha C-1
Author: Vincent Oddo
Distributor: Electronic Courseware Systems

MACGAMUT
Contents: This programme consists of six parts: *MacGamut start* (a sort of 'traffic controller'), *Intervals*, *Scales*, *Chords*, (listening and notation are combined in each of these three modules) *Get Stats* (statistical information on student's progress) and *Set Params* (the available options can be adjusted).
Level: Intermediate

Hardware requirements: Macintosh
Author: (-)
Distributor: Mayfield Publishing Company

MAGIC MUSIC TEACHER
Contents: Suzuki style activities. Melodic identification (up, down, same), rhythmic identification, intermediate melodic identification and rhythm playing. Koala pad or joystick for physically handicapped can be used. Speech synthesis output for visually impaired.
Level: (-)
Hardware requirements: Apple II
Author: (-)
Distributor: Educational Software Review

MAGIC MUSICAL BALLOON GAME
Contents: A game to teach aural recognition of *up*, *down* and *same* for the young child. A short melodic fragment is heard and the child has to indicate the direction of the melody. A balloon moves with the melody - up over mountains, down from the trees, or straight along a fence. The programme consists of three parts which progress in difficulty. The middle part contains more skips and end with a melody in the minor key. Pitches are also notated as balloons on a musical stave. In the third part students can control the balloon, thus being able to create their own melodies.
Level: Elementary
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Sally Monsour, Charles Knox
Distributor: Temporal Acuity Products

MAGIC PIANO LEARNING SYSTEM
Contents: Designed for children, this software package contains three programmes and an accompanying handbook: *Magic Piano* (recording and playback of melodies by typing keys on the Apple keyset), *Rhythm Game* (276 pre-selected rhythms are presented in ten levels and should be tapped on the space-bar) and *Melody Game* (melodic dictation of two to nineteen notes).
Level: Elementary to Advanced
Hardware requirements: Apple II
Author: (-)
Distributor: Edusoft Educational Software

MELOCAPTOR
Contents: This programme is a complete computerized interactive sight-singing system formerly developed for the Exercette computer and adapted for the Apple II. *The Basic vocal intonation* programme is included and microphone input allows immediate feedback to intonation and pitch accuracy. The student can choose between a repetition mode (the computer plays single notes, intervals, tetrachords and arpeggios which must be repeated by the student) or the sight singing mode (a notated note/phrase should be sung without hearing it beforehand).
Level: Intermediate to Advanced
Hardware requirements: Apple IIe, IIGS, Internal Microphone Card, Internal Apple speaker
Author: Martin Prevél
Distributor: Wenger Corporation

MELODIC DICTATION
Contents: The aim of this programme is to hear and subsequently notate a melodic line (pitch and rhythm). The fourteen levels of melodic dictation (ten melodies of gradually increasing complexity at each level) should be used in the listed order unless a student wants to rectify a particular weakness. Each melody played by the computer can be repeated as frequently as needed by the user who should notate his answer on manuscript paper. When the melody is completed it should be "placed" on screen after which the computer evaluates it and calculates a final score. If there are errors, the correct melody can be requested.[5]

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[5] In a letter dated October 1991 Mr. Evans indicated that he developed this programme basically for use in his own classroom situation.

Level: Intermediate to Advanced (Fourteen difficulty levels)
Hardware requirements: Apple II, II+, IIe, IIc, Mini-Amplifier speaker system, AC adaptor, Mini-phone to mini-phone cord or connect to any amplifier with a mini-phone to RCA cord
Author: Benjamin D. Evans
Distributor: Benjamin D. Evans

MELODIC DICTATOR
Contents: This is the first example of a pedagogical music programme developed with *HyperCard*. MELODIC DICTATOR is accompanied by *MIDI Dictator* in which exercises are played on a MIDI device and input is accepted from a MIDI keyboard. The teacher can develop his own set of twenty-four single-line melodic dictation with a maximum of fifteen notes. The *MIDI Dictator* programme is more flexible and provides the opportunity of playing back what was heard, testing only for pitch.
Level: Intermediate to Advanced
Hardware requirements: Macintosh
Author: (-)
Distributor: Center for Performing Arts and Technology

MELODIOUS DICTATOR
Contents: Single-line melodic dictation starting with three-note patterns based upon major and minor seconds and advancing to nine-note patterns utilizing all intervals within the octave. Input of answers through an on-screen graphic representation of a keyboard.
Level: Intermediate to Advanced (Six difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: David B. Williams, David L. Shrader
Distributor: Temporal Acuity Products

MICRO^NOTES MUSIC THEORY
Contents: Intonation and vocal/instrumental pitch representation skills are developed as a student responds to exercises interactively in the manner of a video game by using a microphone to input actual vocal or instrumental sounds which are evaluated by the programme. Instruments with a rich overtone spectrum such as clarinets and saxophones can also be handled by the programme. Up to nine hundred experiences can be provided in all aspects of tonal organization. If a student is, for instance, asked to identify C on the treble-clef stave, he has to sing the note to move the cursor to the proper position instead of moving it with keystrokes or a mouse. The following exercises for progressive development and testing of skills are provided:
Pitch matching and tonal memory, *Sight reading* (by letter name, number, fixed or movable Doh), *Part singing* (in one, two, three or four parts, and vertical chords), *Intervals, triads and inversions, all seventh chords and inversions* (ascending and descending), as well as *Four-part harmonic progressions*.
This software-based music theory course is accompanied by a textbook and computerized testing materials. It allows the teacher to use or modify existing programme materials and keeps progress records for up to three hundred and fifty students. It is not designed for home use but can be integrated into High School and College Music Theory courses.
Level: Intermediate to College
Hardware requirements: Apple IIe, IIGS, MIDI card, synthesizer and external sound system. (A Micro^Pitch Extractor plug-in card and microphone are sold with the programme package.)
Author: Joseph Warren
Distributor: TeAchnology

MUSIC DETECTIVE, THE
Contents: Pitch and rhythm error detection: One wrong note is played during a performance and the student has to locate and identify the type of error.
Level: (-) (Ten difficulty levels)
Hardware requirements: Commodore-64
Authors: John Matheny, Rona Matheny, Art Matheny
Distributor: Temporal Acuity Products

MUSIC DRILLS: EAR TRAINING SERIES PARTS I-III
Contents: The first part of this series is the *Theory fundamentals* which merely concentrates on mastering written theory skills such as note names, intervals, triads, scales and key signatures. The second part *Aural fundamentals* drills users in the aural identification of isolated intervals, triads, scales and seventh chords. In the third part *Dictation I* drills are provided in pitch, rhythmic and melodic ("layer" - both pitch and rhythm) dictation. Answers should be notated on manuscript paper and can be compared with the correct pattern displayed on the screen by

request. The speed of representation and difficulty level can be set by the user, and the pattern to be dictated can be heard as often as needed. New dictation patterns can be created by the user.
Level: Intermediate to Advanced
Hardware requirements: Apple II, II+, IIe, IIc
Author: John E. Hatmaker
Distributor: Wenger Corporation

MUSIC EDUCATION SERIES
Contents: In a constructed set of eleven programmes, drill on note reading, rhythm reading and dictation, rhythm identification, interval construction and recognition, two levels of tonal memory (recognition of played tones within a scale context) and key signature identification are included.
Level: Elementary to advanced (Differs from programme to programme)
Hardware requirements: Apple and Commodore
Author: Floyd Richmond
Distributor: Richmond Educational Series

MUSIC FUNDAMENTALS
Contents: A nine-disk set of materials and a workbook covering basic fundamentals of music theory (intervals, major/minor triads and four tone chords, cadences, signatures, note and scale identification, rhythm, motion, and texture). Aural drills are emphasized over visual drills, and the responses are expected in a very short time requiring focused concentration.
Level: Elementary
Hardware requirements: Apple IIe
Authors: Marc Apfelstadt, Bruce Benward
Distributor: William C. Brown

MUSIC GAMES
Contents: *Hearing is believing*: Aural/visual identification of missing notes in patterns of up to seven notes. *Moving on the staff*: An aural/visual identification of melodic direction of three-note patterns (up, down, same). *Memory*: Student selects diatonic range for a randomly generated melody to be aurally/visually identified. *Rhythm I*: A one-measure rhythmic pattern is presented for the student to "tap" back using the game button. *Rhythm II*: As above but with two-measure examples. *Rhythm III*: As above but with added dotted quarter-notes and eighth-notes.
Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: Howard W. Sams & Company

MUSIC LESSONS
Contents: Apart from drills in written theory skills (note names, circle of fifths, key signatures, intervals, chords etc.) aural training in intervals and scales is also included.
Level: Beginning to Advanced (Multiple levels of difficulty)
Hardware requirements: Macintosh Plus or greater; MIDI compatible.
Author: (-)
Distributor: MiBAC

MUSIC READINESS
Contents: Five games for early childhood to teach melodic direction rhythm, and duration.
Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: Edcomp

MUSIC READINESS: PITCH AND RHYTHM
Contents: This programme consists of two components: a pitch (five "games") and rhythm component (four "games"). The following exercises are included in the pitch component: *Highlow* (correct indications of the highness or lowness of a pitch cause a bird to fly across the screen and land on a branch of a tree for high pitches or down on a fence for low pitches), *Updown* (melodic contour - ascending and descending melodies), *Stairsteps one and two* (aural discrimination between steps and skips using the pitches C, D and E), *Keyboard* (correct indication of steps and skips is displayed on an on-screen keyboard). The rhythm component consists of: *Demo* (tutorial on various note values), *Rhythmfish* (note values have to be indicated by typing one (quarter note), two (half note) etc.), *Rhythmvan* (review of note values), *Rhythmclown* (the number of beats in a displayed pattern of note values has to be typed in).

Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: Sterling Swift Publishing Company

MUSIC ROOM
Contents: Six instruments (piccolo, violin, trumpet, saxophone, cello, and tuba) must be individually tuned to a tuning pitch in its own register. Tuning instructions such as "lengthening" or "shortening" are used to match the pitches of each instrument.
Level: Elementary
Hardware requirements: Commodore-64/128
Author: Ray E. Zubler
Distributor: Electronic Courseware Systems

MUSIC STUDENT
Contents: Music theory and aural training exercises. (The contents of the aural exercises were not commented on in the examined sources.)
Level: Elementary to Intermediate
Hardware requirements: Apple II
Author: (-)
Distributor: ACS Software

MUSIC THEORY
Contents: MUSIC THEORY consists of eighteen separate programmes in which written and aural skills are combined. In the following programmes aural work is involved: *Aural Intervals* (recognition of major, minor, perfect and augmented intervals), *Find the half* (identification of half-steps appears in a given three- to five- note scale pattern, *Missing note* (one note is missing in a diatonic five- note visually displayed sequence. The sequence is played and the missing note should be aurally identified by naming the note), *Rhythm* (Aural/visual matching of one aural and three displayed notation versions), *Rhythm play* (rhythm reading by tapping the displayed rhythm on the letter *N* of the keyboard), *Scales* (aural identification of major, all three minor scales, dorian, phrygian, lydian, and mixolydian modes), *Sevenths* (aural identification of five types of arpeggiated seventh chords, *Triads* (aural identification of arpeggiated major, minor, augmented and diminished triads) *Whole-Half* (aural identification of melodic whole- and half-step intervals), *Wrong note* (aural/visual identification of the incorrect note in a given five-note passage)
Level: Elementary to Advanced
Hardware requirements: Apple 48K
Author: Linda Borry Hausmann
Distributor: MECC

MUSIC TUTOR & MIDI MUSIC TUTOR
Contents: Music theory and listening skills are taught on four disks. A differentiation is made between free practice (content can be modified and no scores are kept) and guided practice (instructional content and advancement criteria pre-determined). The guided practice section has a pre-practice mode in which no evaluation is made. In the evaluation mode the unit test has to be passed in order to move on to the next unit. The following dictation programmes are included: *Intervals* (nine dictation units of melodic and harmonic ascending/descending intervals which can be answered by naming the interval, by writing it on a stave, or by playing it on the keyboard), *Chords* (chord identification by naming it or playing it on the keyboard), *Matching and Tuning* (pitch matching by moving a pitch up or down until it matches a reference pitch, and chord tuning by tuning the upper two notes of major, minor, augmented and diminished triads), *Melodic Games* (a melody increasing in length has to be dictated by means of entering solfeggio syllables or numbers. No chromatic alterations are included). *Ear Teacher* (a record-keeping programme for the Music Tutor programmes. The pre-sets can be modified using this programme and timbres changed.)
Level: (-)
Hardware requirements: Apple II, II+, IIe, MIDI keyboard or Soundchaser keyboard and plug-in synthesizer card
Author: Charles Boody
Distributor: Wenger Corporation[6]

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6 Note in SIUE compendium, p. 3: "Programs listed for Wenger, are all currently out of print and commercially unavailable!" No response was received by the researcher to a letter written to Wenger Corporation.

MUSICAL STAIRS

Contents: Colourful aural-visual music game designed to give the younger student practice in identifying intervals on the bass or treble clefs. Using a graphic representation of a piano keyboard, intervals ranging from unison to octaves are played and the student is asked to identify the correct interval by moving the pointer on the keyboard to the second note of the interval. Each ten-item sequence progresses in difficulty. A MIDI version is also available, using one octave of the "white keys". The question is notated on the staff and musically reproduced through the MIDI synthesizer, playing answers on the keyboard.
Level: Elementary
Hardware requirements: Apple II, Atari ST, Commodore 64/128, IBM PC or compatible, Yamaha C-1, MIDI version also available
Author: Steve Walker
Distributor: Electronic Courseware Systems

MUSICOM: EAR TRAINING AND SIGHT SINGING

Contents: In this education series several other music theory programmes are included. *Ear Training and Sight Singing* is the only programme especially designed for Aural Training purposes. The student has to sing into a microphone and the computer analyses the pitch and rhythm accuracy. In eighteen lessons the programme deals with: *Single note singing*, *Singing tunes* (after singing a displayed melody, the student's answer appears in notation. The answer is not judged but is is assumed that the user will compare the two displays and determine errors.), *Melodic intervals* (repeat vocally heard intervals), *Harmonic intervals* (the student has to answer by singing either the high or low note first), *Sight singing* (vocally produce intervals with either the first or second note given) and *Theory outline* (tutorial and curriculum guide in which the range of tones, scales, melodies and intervals that appear in the whole programme is explained).
Level: Intermediate to Advanced
Hardware requirements: IBM PC or compatible, PRD card, microphone, MIDI keyboard, Apple II, Z-80 card, Xanadu interface card, MPU-401 MIDI processor and MIDI keyboard
Author: (-)
Distributor: Roland CorpUS (Copyright Xanadu)

NAME IT: KIDS' CLASSIC

Contents: Scale degree recognition is taught in that the name of a familiar tune should be correctly guessed in the fewest possible notes. A melodic fragment is heard and additional notes (pitches) are earned by identifying scale tones. Twenty-four different melodies are available.
Level: Elementary
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Bruce Benward, David B. Williams
Distributor: Temporal Acuity Products

OHRTRAINER 1 & 2

Contents: OHRTRAINER 1 consists of single-line tonal melodic dictations and interval recognition in C major. In the more advanced OHRTRAINER 2, two-part tonal and atonal melodic dictations and intervals are included. OHRTRAINER MINI concentrates only on intervals. Traditional notation in treble and bass clefs is used. The same programme exists in the form of cassettes for the Color Genie EG 2000.
Level: Intermediate to Advanced
Hardware requirements: Commodore-64, Color Genie EG 2000
Author: Herbert Stelz
Distributor: Wilhelm Lutz

PATTERNS IN PITCH

Contents: This aural-visual companion programme for PATTERNS IN RHYTHM consists of two parts. In the first part, *The composer*, pitch patterns can be created in the treble or bass clef. Computer-played pitch patterns based on the key and number of pitches selected by the user should be notated in the second part, *The dictator*. Level I uses the keys C, G, and F with up to 8 notes in the series. Level II adds D, A, B-flat, and E-flat and plays up to 12 pitches. In Level III the user may choose any major or minor key and up to 12 pitches to be played.
Level: Intermediate
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Yamaha C-1
Author: Vincent Oddo
Distributor: Electronic Courseware Systems

PATTERNS IN RHYTHM
Contents: An aural/visual programme to teach rhythmic memory allowing students to compose simple and compound meters. *The composer* section plays melodies based on rhythms designed by the user who selects patterns from a menu. In *The dictator* quiz section, randomly selected rhythmic examples are played which the user must identify. The user selects from 2/4, 3/4, and 4/4 meters in level I, 6/8 is added in level II, and level III includes all simple and compound meters. Student records are kept.
Level: Intermediate
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Yamaha C-1
Author: Vincent Oddo
Distributor: Electronic Courseware Systems

PERCEIVE
Contents: A Drill and practice set of programmes which includes a textbook and workbook designed to help bridge the gap between hearing music and understanding it. Listening, reading, and writing are combined in the exercises, and programmes for designing and drawing sound waves are also included.
Level: Intermediate to Advanced
Hardware requirements: Macintosh 512 or higher, MIDI playback optional
Author: (-)
Distributor: Coda Music Software[7]

PIANOWORKS
Contents: Although primarily a programme for teaching a first-year course in piano, ear training exercises such as interval training, playing "two-handed" rhythm exercises and finding the omitted note in a series of played notes are also included.
Level: Beginners
Hardware requirements: IBM PC, XT, AT or 386 or better with 640K RAM, VGA/EGA/CGA graphics with a colour monitor, DOS 2.1 or later, MIDI keyboard with full sized keys or at least 4 octaves, MPU-401 type MIDI interface, or a Covox Soundmaster II or Soundblaster card
Author: (-)
Distributor: Temporal Acuity Products

PITCH DUEL
Contents: Pitch matching and harmonic tuning skills are refined. The frequency of a second pitch is manipulated by the student, using the up and down cursors on the computer keyboard, until it matches the first fixed pitch. All triads and their inversions, major and minor seventh chords are included in the harmonic tuning activity.
Level: (-) (Forty difficulty levels)
Hardware requirements: Commodore-64
Authors: John Matheny, Rona Matheny, Art Matheny
Distributor: Temporal Acuity Products

PITCH-U-LATION
Contents: The relationship between standard notation symbols and their corresponding sound is emphasized. Solfège syllable identification is also reinforced. A scale segment is displayed on the screen and syllables or numbers appear above the staff. One or more pitches are played and the student has to identify the pitches by "touching" the note with a light pen or by directing the arrow with cursor keys or a joystick.
Level: (-) (Six difficulty levels)
Hardware requirements: Commodore-64
Authors: John Matheny, Rona Matheny, Art Matheny
Distributor: Temporal Acuity Products

PLAYBACKS
Contents: A heard melody (either through headphones or speakers) is played back by using the synthesizer keyboard. The "playback" performance is analysed and student records are kept.
Level: Intermediate
Hardware requirements: IBM PC or compatible, MIDI interface and keyboard
Author: Susan Maxwell
Distributor: Electronic Courseware Systems

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7 In a letter dated February 1991 the sales representative of Coda Music Software informed the researcher that Coda had discontinued the sale of *Perceive*.

PLAY IT BY EAR

Contents: On an on-screen piano and guitar fretboard heard single tones, intervals, melodies, chords and scales should be *repeated* by clicking on the appropriate key or the location on the fretboard. *Recognition* tasks such as identifying scales and modes, both harmonically or melodically played intervals and chords are also included. The correct answer is selected from a list on the screen. The single-note exercise is intended to develop pitch memory. The student has control over the ambitus, length, inversion, etc. of an exercise. A 64 page manual, complete with a tutorial and glossary of terms is included.
Level: Intermediate - Advanced (Six progressive skill levels)
Hardware requirements: IBM PC or compatible with at least 640K RAM, DOS 2.0 or higher, CGA/EGA/VGA/Mono or Hercules Graphics card, mouse, internal computer speaker. Standard MIDI interface recommended.
Author: (-)
Distributor: Ibis Software

PRACTICA MUSICA

Contents: An interactive written and aural music theory course with accompanying textbook. The contents include drills in learning stave notation in connection with its place on the on-screen keyboard (MIDI keyboard), correct writing of chords (seventh chords included), aural recognition of intervals, rhythmic dictation, melodic dictation and combined rhythmic and melodic dictation as well as the composition of custom melodies. When dictating, for example, rhythm, the pitches of the melody appear automatically, and when dictating pitch, rhythmical values are automatically supplied. Melodies for dictation purposes can be chosen from a library of excerpts of melodies taken from the music literature, or can be randomly generated by the programme. The feature of customizing melodies makes it possible for the teacher to insert special melodies for training. Other features are adjustable tuning (e.g. 12-note equal, Kirnberger 1/2 comma), an enharmonic keyboard, a "clap on the beat" for dictation purposes, as well as a progress report for each student.
Level: Elementary to Advanced
Hardware requirements: Macintosh Plus or greater. Internal computer speaker, standard MIDI interface and MIDI synthesizer optional
Author: Jeffrey Evans
Distributor: Ars Nova Software

RHYTHM ACE

Contents: Three exercise modes: *Playback* (tapping) on mouse/left and right shift keys of displayed notation; *Dictation* of played rhythmic phrase through typing in notation; Entering of *own rhythms* for drill purposes. Two-part rhythmic training also possible. Time signature, notation values, tempo, etc. can be controlled by the student. Rhythms can be chosen from classical and jazz-orientated libraries. Student progress available through graphs, exercise summaries and printed reports.
Level: Intermediate - Advanced (Twelve progressive skill levels)
Hardware requirements: IBM PC or compatible, CGA/EGA/VGA/Mono or Hercules Graphics card, internal computer speaker. Standard MIDI interface recommended.
Author: (-)
Distributor: Ibis Software

RHYTHM DRILLS

Contents: Rhythmic memory is developed through rhythmic single-line dictation within a melodic context of eight notes. Values range from whole to sixteenth notes, dotted quarters and halves.
Level: Intermediate to Advanced (Seven difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: George Makas
Distributor: Temporal Acuity Products

RHYTHM MACHINE

Contents: The student's ability to recognize written rhythmic patterns that correspond to melodies being played is developed. A melodic line is played after which four different rhythmic patterns are displayed. The correct pattern has to be chosen. Points are subtracted for time delay.
Level: Intermediate to Advanced (Four difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe.
Author: David J. Otterson
Distributor: Temporal Acuity Products

RHYTHM MASTER
Contents: (-)
Level: (-)
Hardware requirements: IBM PC or compatible
Author: (-)
Distributor: Melodian Systems

RHYTHM READER
Contents: A programme in which the Orff-Kodály rhythm notation is presented for identification. Random or sequenced rhythm patterns are performed by the student.
Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: Tutor Courseware

RHYTHM WRITE
Contents: The student has to notate on paper rhythmic sequences played by the computer. After a predetermined time-delay the correct answer is revealed by the computer.
Level: Intermediate to Advanced (Ten difficulty levels)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Ian Polster
Distributor: Temporal Acuity Products

RHYTHMATICITY
Contents: Displayed rhythms of melodies should be tapped on any computer key. Each melody tone (pitch) is heard as it is tapped and a smiling face moves along from note to note.
Level: (-) (Thirty difficult levels)
Hardware requirements: Commodore-64
Authors: John Matheny, Rona Matheny, Art Matheny
Distributor: Temporal Acuity Products

RHYTHMIC DICTATOR
Contents: After a pulse is established, a rhythmic phrase is played. The correct number of empty measures appears on the screen and the student has to choose the correct answers from a list of possible one-measure answers. The programme automatically adjusts the difficulty level according to the student's performance.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Phyllis G. Parr, David L. Shrader, David B. Williams
Distributor: Temporal Acuity Products

SCALE LAB
Contents: In a set of three disks (nine activities and five information programmes) the relationship between sound, name and notation of tones, intervals and scale degrees is taught. The programmes on disk one drill the naming of written intervals. Programmes on disks two and three include: *Naming Diatonic Degrees in Major scales*, *Naming Chromatic Degrees in Major scales*, *Naming Diatonic and Chromatic Space in Major scales*, *Listening to Melodic Patterns in Choice of Scales, with C as Tonal Center, and Naming Their Tones Using Moveable-do Syllables* and *Listening to Melodic Patterns Using Scales, with Various Tonal Centers, and Playing Their Tones on a Screen Keyboard.*
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Robert Trotter
Distributor: Temporal Acuity Products

SEBASTIAN II
Contents: Aural/visual discrimination is developed through melodic error detection. On-screen melodies are written in the treble, bass, alto or tenor clefs. After a melody is played, the student has to indicate if pitch, rhythm, tempo or no errors appeared. Only one error occurs in a melody. Pitch errors include *wrong notes* or *out of tune* notes. The difficulty levels range from simple scales in the treble clef to atonal melodies in mixed meter with double sharps and flats. This programme is teacher programmable, enabling teachers to create melodies and errors tailored to their exact class needs.
Level: Elementary to Advanced (Five difficulty levels with ten melodies each)

Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: Brain R. Moore
Distributor: Temporal Acuity Products

SINGING MASTER
Contents: Intervals, rhythm and chord analysis are taught through the "see it, hear it, and sing it" approach.
Level: (-)
Hardware requirements: Apple II
Author: (-)
Distributor: MasterSoft

SIR WILLIAM WRONG-NOTE
Contents: This is an aural/visual four-part error-detection programme in which the wrong note in a four-voice harmonic context is to be identified as a result of comparing sound and notation. Drills on major, minor, diminished and augmented chords, all seventh chords and augmented sixth chords are included.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Author: J. Timothy Kolosick
Distributor: Temporal Acuity Products

SOFTWARE TO ACCOMPANY EAR-TRAINING: A TECHNIQUE FOR LISTENING
Contents: Software was developed to accompany the Bruce Benward text by the same title. In *Introductory Ear Training* melodic, harmonic and rhythmic dictation as well as error detection appear. *Advanced Ear Training: Tutorial* and *Advanced Ear-Training: Testing* are designed for second-year Aural Training in the USA and keyed to Benward's text *Advanced Ear Training.* The curriculum is not generative in the sense that the computer measures the skill level of the student and generate as many exercises as the students needs to master a level. Instead, the software follows exactly the exercises in the workbook.
Level: Elementary to Advanced
Hardware requirements: Apple II, II+, IIe, IIGS, DAC board
Authors: Bruce Benward, Brian Moore
Distributor: William C. Brown

SOL-FA PRACTICE
Contents: Solfeggio syllables are studied and reviewed.
Level: Elementary
Hardware requirements: Apple II
Author: (-)
Distributor: Tutor

SOLFEGE: MELODIC DICTATION
Contents: A series of traditional melodic dictation on four disks. Rhythm and intervals are corrected, and a set of music labels for computer keys is included
Level: Advanced
Hardware requirements: Apple II
Author: (-)
Distributor: Conduit

SOUND, SONG, AND VISION
Contents: (-)
Level: Intermediate
Hardware requirements: Apple IIGS, a microphone to MIDI software translator
Author: (-)
Distributor: Advanced Software

SUPER CHALLENGER
Contents: Audio-visual game: memory of a series of pitches. The game is based on a 12-note chromatic scale, a major scale, and a minor scale. Each pitch is reinforced visually with a colour representation of a keyboard on the display screen. Expanded version of EAR CHALLENGER.
Level: Middle School

Hardware requirements: Apple II, Atari ST, Commodore 64/128, IBM PC or compatible, Yamaha C-1. MIDI version also available
Author: Steve Walker
Distributor: Electronic Courseware Systems

TAKE NOTE
Contents: *Recognition* drills for pitch, intervals, chords, arpeggios and scales, *spelling* drills for note names, notation, guitar positions or piano positions, on-screen displays, intervals from unison to a major fourteenth, chords up to eight notes, over thirty scales etc.
Level: ? to Advanced (Total control over the difficulty of all drills)
Hardware requirements: Atari ST or Amiga, TOS in ROM, internal computer speaker or any MIDI synthesizer
Author: (-)
Distributor: Take Note Software

TAP-IT
Contents: The concepts of beat and tempo are taught through the presentation of rhythms and tapping drills where students respond after either listening to or reading rhythm patterns. The lessons have three skill levels with an option for a Final Quiz using the rhythms from level three. A non-stop quiz at the end of each level drills rhythm accuracy, and the final quiz functions on the "All-Pro" level.
Level: Intermediate to Advanced
Hardware requirements: Apple II (not available for Apple IIGS), IBM PC or compatible, Yamaha C-1
Author: G. David Peters
Distributor: Electronic Courseware Systems

THEORY SAMPLER
Contents: THEORY SAMPLER consists of five programmes in one. The major, minor and church modes that were learnt theoretically in the first programme have to be aurally recognized in the second programme. In the third and fourth programmes triad (major, minor, diminished, augmented) and seventh chord (all types) construction and spelling are drilled. These triads and seventh chords have to be aurally recognized in the fifth programme.
Level: Intermediate to Advanced
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: Dennis Bowers, David B. Williams
Distributor: Temporal Acuity Products

TONEY LISTENS TO MUSIC
Contents: Children have to distinguish between the same and contrasting music patterns. By pressing the letter *T* the student hears the cartoon figure Toney's tune. One of two tunes matches Toney's. The student may listen to Toney's tune and the tunes in boxes *1* and *2* as often as desired. The teacher has control over e.g. tempo in which melodies are played, the number of questions asked in each level. The questioning order can be changed and student records can be kept.
Level: Elementary, for children as young as three years (Ten levels of twenty-five items each)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+ and IIe
Authors: David B. Williams, Donna Brink-Fox
Distributor: Temporal Acuity Products

TUNE-IT II
Contents: An out-of-tune pitch must be adjusted until it is in tune. Using a graphic representation of a stringed instrument's fingerboard, two pitches are played, with the second out of tune with the first one. The second pitch has to be adjusted until it matches the first. The pitch differentiation is finer for the more difficult exercises. Records are kept of student scores.
Level: Intermediate
Hardware requirements: Apple II, Commodore-64/128, IBM PC or compatible, Macintosh Plus or greater, Yamaha C-1
Author: Fred Willman
Distributor: Electronic Courseware Systems

TUNER: INTONATION DRILL
Contents: Two pitches are presented by the computer. The second pitch should be tuned to match the first by pressing *R* (raise) and *L* (lower).
Level: Intermediate to Advanced

Hardware requirements: Apple II, II+, IIe, IIc, ALF synthesizer optional
Author: Don Pederson
Distributor: Conduit

TUNE-UP
Contents: The second of two pitches should be determined as sharp, flat or in-tune and then adjusted until it is in tune.
Level: Intermediate (Three difficulty levels)
Hardware requirements: Apple II series, Commodore-64/128
Author: Paul Swan
Distributor: Swan Software for Arts Education

TUNING TUTOR
Contents: This is a three-level programme for instruction, drill and practice in tuning. The student can select the voice or instrument range and difficulty level.
Level: (-)
Hardware requirements: Apple IIGS, DAC Board required for Apple II, II+, IIc and IIe
Author: William Higgins
Distributor: William Higgins

UNIVERSITY OF AKRON SERIES[8]
Contents: Several written and aural skills are included in this series of computer software. *Aural Interval Recognition:* It consists of eleven units of ascending and descending melodic interval dictation. *Melodic error detection and correction:* Eleven units of aural/visual detection and correction of melodic errors. One, two or no errors appear in the notated version. Mistakes are corrected by moving the cursor to position pointers under the errors and by pressing U or D to move notes up or down. *Melodic/Rhythmic dictation:* Notate aural melodies presented at random by the computer. The programme provides practice in both melodic and rhythmic dictation. Tempo and play options are regulated by the user without scoring penalty. Rhythm can only be entered after pitch. *Mr Metro Gnome/Rhythm I-IV*: Each programme starts with a tutorial presented by Mr Metro Gnome who is a stick figure with an animated foot that taps beats. The student has to tap displayed rhythms on the space bar. In I quarter, half and whole notes are presented. Eighth notes are added in II, dotted rhythms in III and sixteenth notes in IV.
Level: Elementary to Advanced
Hardware requirements: Apple II, II+, IIe, IIGS, ALF card or MIDI keyboard
Author: Virgil Hicks
Distributor: Wenger Corporation

List of articles, books, catalogues and directories used for the compilation of the list

Arnold, Ekkehard "Nicht nur das Ohr... Gehörbildungsprogramme für die Schule" in **Musik und Bildung**, 12 (December 1990) pp. 700-704.

Bartle, Barton,.K. **Computer Software in Music and Education: a guide.** London: Scarecrow, 1987.

Blais, F. and M. Prevél "The Melocapteur: A Pitch Extractor Peripheral Design for Ear Training in Music" at the **Fourth Canadian Symposium on Instructional Technology: Computer Technologies for Productive Learning**. Winnipeg, Manhattan: National Research Council of Canada, 1983 pp. 515-518.

Campbell, Bruce B. "Music Theory Software for the Macintosh" in **Journal of Music Theory Pedagogy**, 2/1 (Spring 1988) pp. 133-152.

Dames, Jean and Douglas Susu-Mago "Mr. Metro Gnome/Rhythm I" in **Clavier**, November 1986 pp. 34-35.

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8 According to Barton, K. Bartle (**Computer Software in Music and Education: A Guide.** London: Scarecrow, 1987), these programmes are now included in **THE MUSIC CLASS SERIES**.

Electronic Courseware Systems **Instructional Software Catalog 1991**. Champaign. Illinois: Electronic Courseware Systems (ECS), 1991.

Evans, Jeffrey **Practica Musica Booklet and Manual Supplement Practica Musica 2.0.** Santa Barbara: Ars Nova Software, 1988.

Flender, Reinhard "Musikerziehung mit Hilfe von Computerprogrammen" in Günther Batel, Günter Kleinen und Dieter Salbert (Eds), **Computermusik - Theoretische Grundlagen, kompositionsgeschichtliche Zusammenhänge, Musiklernprogramme.** Laaber: Laaber, 1987 pp. 160-163.

Hempel, Christoph **'midi-pädagagogische schriftenreihe', Heft I: Der Einsatz des Computers in der Gehörbildung.** Berlin: Musiklabor Ekkehard Arnold, 1990.

Instruction Manuals of the Audimax programme: **Diatonische Melodien (1987), Diatonische Melodien mit chromatischen Nebennoten (1987), Akkorde (1989), Intervalle (1989), Punkdiktate (1989), Rhythmus V.1.0 (1990).** Hannover: Prof. Christoph Hempel, Hochschule für Musik und Theater.

Higgins, William R. **Computer applications in Music Education for the Apple II Series, Macintosh, & IBM Microcomputers.** Grantham, Pennsylvania 1990.

Hofstetter, Fred T. "Computer-based Aural Training: The Guido system" in **Journal of Computer-based Instruction**, 7/3 (February 1981) pp. 84-92.

Computer Literacy for Musicians. Englewood Cliffs, N.J.: Prentice Hall,1988.

The Guido Music Learning System: Ear-Training Lessons - Student Guide. Newark: University of Delaware, 1989.

Holsinger, Erik "The Musical Tutor" in **MacWorld**, December 1987 pp. 148-149.

Kleinermanns, Ralf "Advanced Keyboard Tabulator: Keyboard-Lernprogramm für Atari" in **Keyboards - Homerecording & Computer**, October 1991 pp. 118-123.

"C-Lab Education Software: Lernprogramme für Atari ST" in **Keyboards - Homerecording & Computer**, November 1990 pp. 122-138.

Kuzmich, John Jr. "Tuning Software: Applied Ear Training!" in **The School Musician**, 58 November 1986 pp. 4-11.

Lorek, Mary Jo "Computer Analysis of Vocal Input: A Program that Simulates College Faculty Sight Singing Evaluation" in **Computers in Music Research**, 3 (Fall 1991) pp. 121-138.

Magic Music **Der Katalog: Ich mach' Musik mit'm PC.** Öhringen: Magic Music 1991.

IBMusikalisch? Katalogisch! Hard- und Software Stand 3/90. Öhringen: Magic Music 1990.

MIDIA TIMES: Info für Musik und Computer, Piano und MIDI. Schwabbach: Magic Music, Autumn 1992.

Makas, George "Sebastian II" in **The Instrumentalist**, May 1986 76-79.

Minnesota Educational Computing Consortium (MECC) **MECC Education Catalog 1992-1992.** Minneapolis, Minnesota: MECC, 1991.

Neimann, Marcus L. "Aural Skills Trainer" in **The Instrumentalist**, May 1987 p. 88.

"CAMUS: Melodic Dictations" in **The Instrumentalist**, January 1987 p. 77.

"Early Music Skills" in **The Instrumentalist**, February 1987 p. 12.

"Music Education Series" in **The Instrumentalist**, November 1987 pp. 8-10.

"The Rhythm Machine" in **The Instrumentalist**, September 1986 p. 95.

"Tuner Intonation Drill" and "Interval Drillmaster" in **The Instrumentalist**, August 1986 pp. 49-50.

Placek, Robert W. "Basic Musicianship" in **Music Educators Journal**, 71 (Nov. 1985).

"Ear Training with Computer Assistance" in **Music Educators Journal**, 76 (April 1990) pp. 6-9.

"Foundations of Music: A Computer-Assisted Introduction" in **Music Educators Journal**, 73 (March 1987) pp. 56-58.

"GUIDO Music Learning System: Ear-Training Lessons" in **Music Educators Journal**, October 1987 pp. 76-79.

"Listen" in **Music Educators Journal**, January 1987 pp. 18-21.

"Mr. Metro Gnome/Rhythm II" in **Music Educators Journal**, 72 (Jan. 1986) pp. 17-19.

"Tuner: Intonation Drill" in **Music Educators Journal**, 72 (Feb. 1986) pp. 18-20.

Riede, Bernd "Offene Ohren durch gespeicherte Klänge - Gehörbildung mit dem Computer: Fünf Programme im Vergleich" in **Neue Musikzeitung**, (April/May 1991) pp. 56-60.

Rothstein, Joseph "Review: Play it by Ear: Ear-training Software for IBM PCs" in **Computer Music Journal**, 15/3 (1991) pp. 122-124.

Rüdiger, Hans Jörg "Schott ComputerKolleg Musik: Gehörbildungs-Software für Atari ST" in **Keyboards - Home-recording & Computer**, March 1991 pp. 144-147.

Russell, Benjamin "Product review: Ear Training Software for the Mac" in **Canadian Musician** 10/3 (1988) p. 26.

Soundware **Soundware: Your MIDI Source** (Catalogue). Menlo Park: Soundware, Fall/Winter 1992.

Southern Illinois University Edwardsville (SIUE) Unpublished compendium of software used at SIUE: "Educational Software for Music", in **Music Computer Lab,** Winter 1990.

Stelz, Herbert "Ohrtrainer - Gehörbildung mit System" in **Katalog 1991**. Darmstadt: Wilhelm Lutz, 1991.

Temporal Acuity Products (TAP) **Temporal Acuity Products** (Catalogue). Bellevue: TAP, [n.d.]. Accompanying letter dated October 1991.

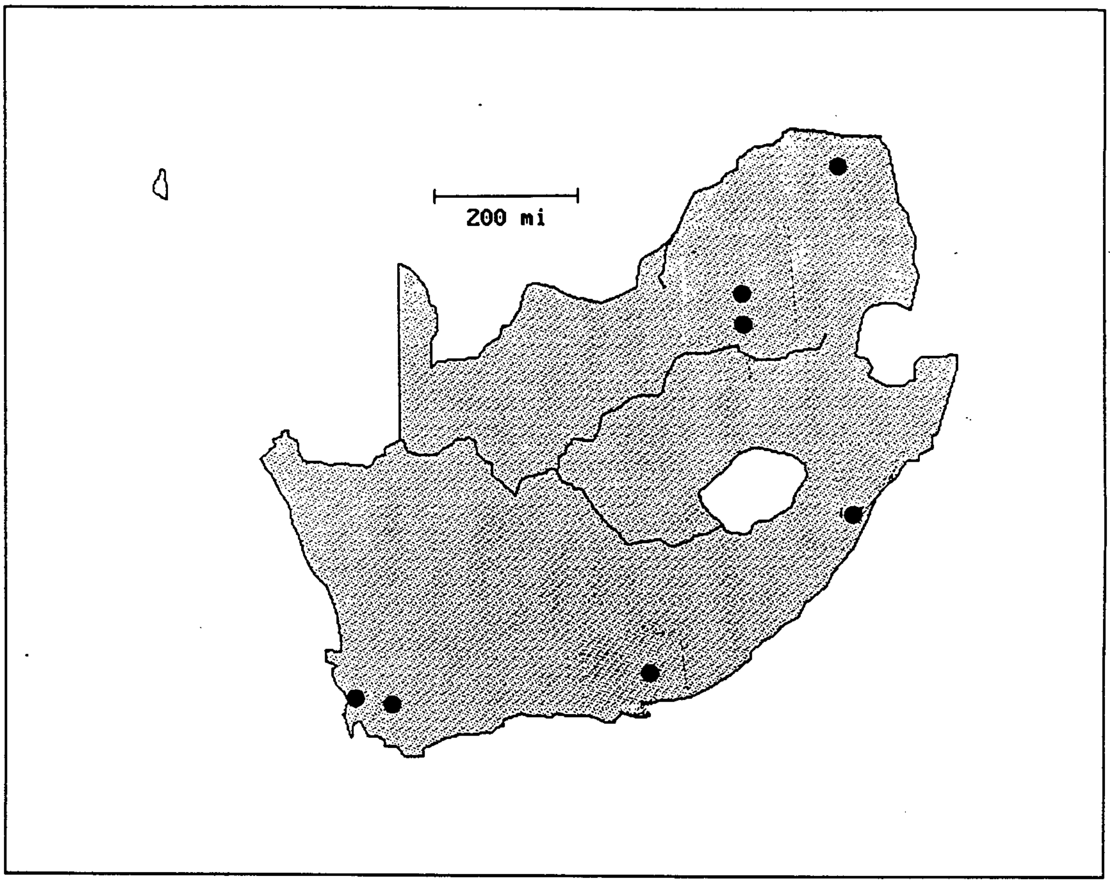
Thornburg, David D. "Music to My Ears" in **inCider**, September 1990 pp. 89-90.

Tutaj, Duane "Software Reviews" The Ear" in **The Instrumentalist**, 43 (March 1989) p. 10.

APPENDIX F

MAPS OF THE THREE COUNTRIES AND NAME LISTS OF UNIVERSITIES/MUSIKHOCHSCHULEN

Map A: Response distribution in the Republic of South Africa[1]



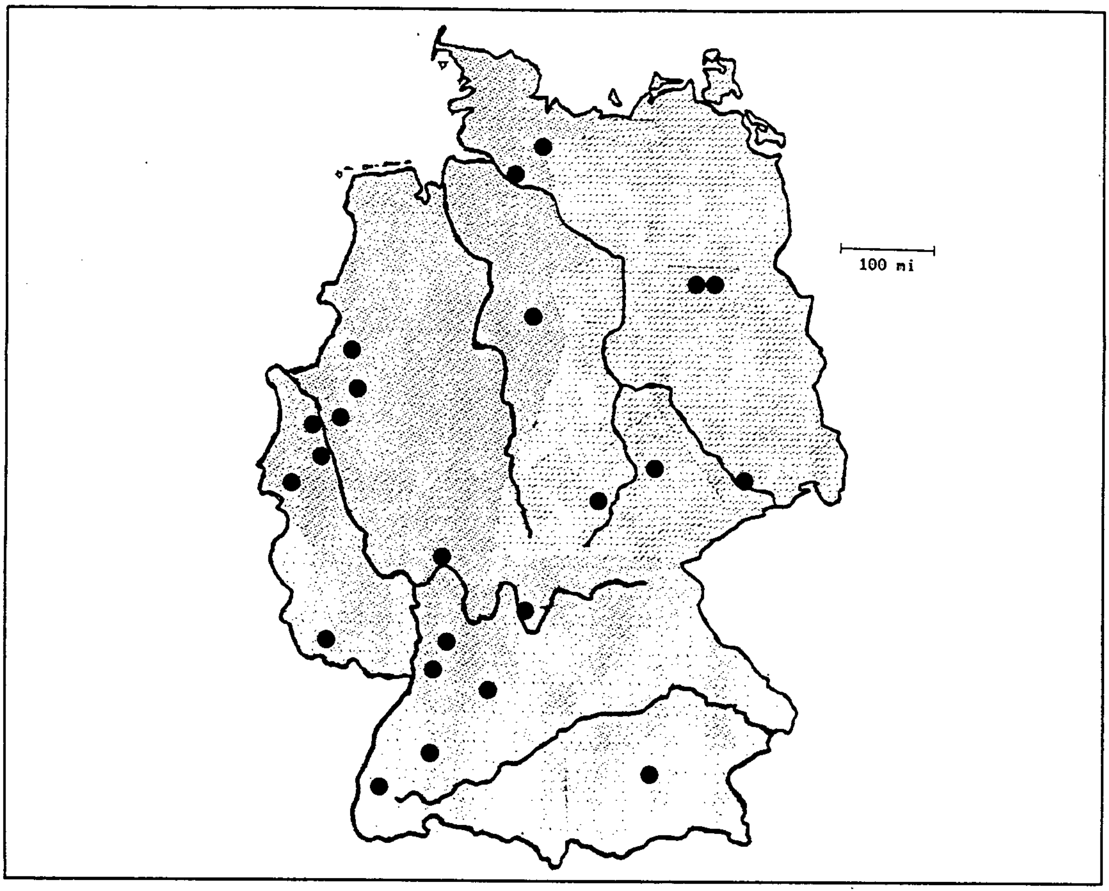
- Potchefstroom University for Christian Higher Education
- Rhodes University *
- University of Cape Town *
- University of Durban-Westville
- University of Natal-Durban *
- University of the Orange Free State
- University of Port Elizabeth
- University of Pretoria *
- University of Stellenbosch *
- University of Venda *
- University of Western Cape
- University of the Witwatersrand *
- University of Zululand

N = 7

1 The asterisks in the three lists indicate that lecturers at these Universities/Musikhochschulen completed and returned their questionnaires. Only these universities appear on the maps.

Maps were drawn from the computer programme **PC Globe** (1989). In the case of Germany the maps of West and East Germany were combined to form one map. (1Mi=1.6km)

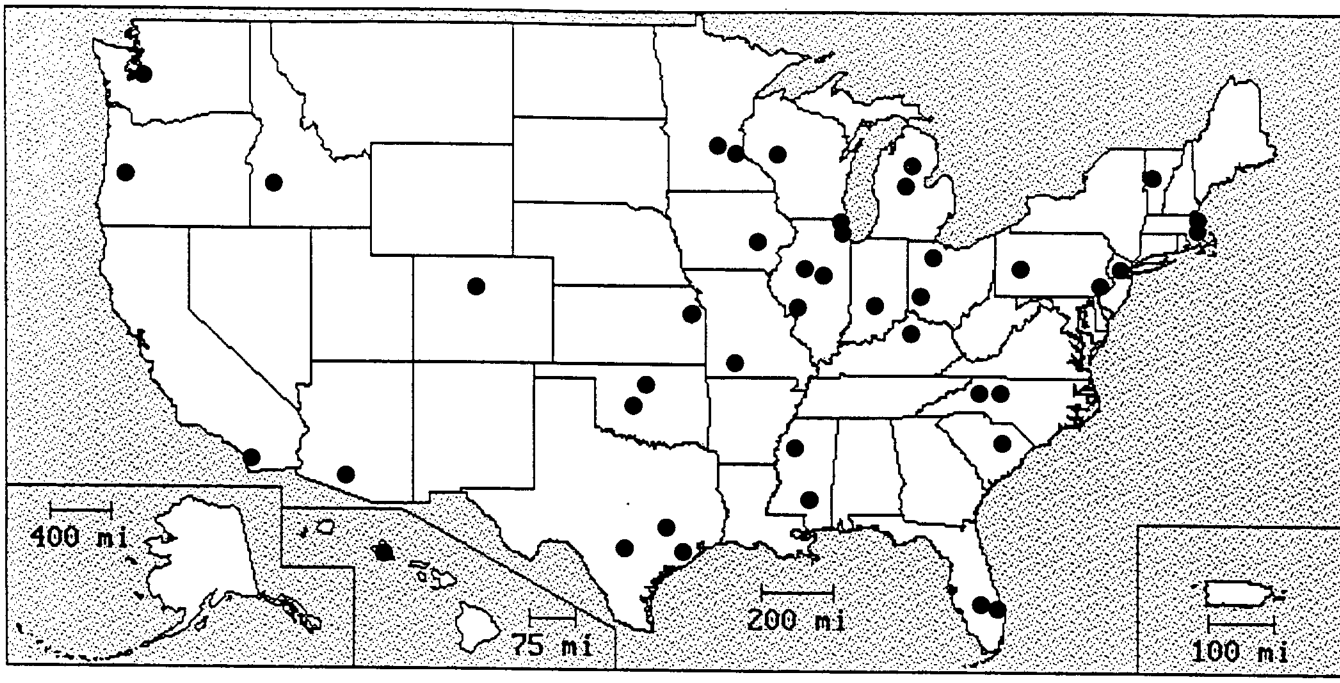
Map B: Response distribution in the Federal Republic of Germany



- Folkwang Hochschule Essen
- Hochschule der Künste Berlin *
- Hochschule für Musik "Hanns Eisler" Berlin *
- Hochschule für Musik Detmold
- Hochschule für Musik Detmold, Abteilung Dortmund *
- Hochschule für Musik Detmold, Abteilung Münster *
- Hochschule für Musik "Carl Maria von Weber" Dresden *
- Robert-Schumann-Hochschule Düsseldorf *
- Hochschule für Musik und Darstellende Kunst Frankfurt *
- Hochschule für Musik und Darstellende Kunst Hamburg *
- Hochschule für Musik und Theater Hannover *
- Hochschule für Musik Köln *
- Hochschule für Musik Köln, Abteilung Aachen *
- Hochschule für Musik Köln, Abteilung Wuppertal *
- Hochschule für Musik "Felix-Mendelssohn-Bartholdy" Leipzig *
- Hochschule für Musik München *
- Hochschule für Musik "Franz-Liszt" Weimar *
- Hochschule für Musik Würzburg *
- Musikhochschule Lübeck *
- Musikhochschule des Saarlandes *
- Staatliche Hochschule für Musik Freiburg im Breisgau *
- Staatliche Hochschule für Musik Heidelberg-Mannheim *
- Staatliche Hochschule für Musik Karlsruhe *
- Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart *
- Staatliche Hochschule für Musik Trossingen *

N = 69 (The total number of asterisks is less than 69 because some *Musikhochschulen* received more than one questionnaire.)

Map C: Response distribution in the United States of America



- University of Alabama (Alabama)
- University of Alaska (Alaska)
- University of Arizona (Arizona) *
- Arkansas State University (Arkansas)
- California Institute of the Arts (California)
- California State University, Long Beach (California)
- California State University, Northridge (California) *
- San Diego State University (California) *
- San Jose State University (California)
- University of Southern California, Los Angeles (California)
- University of Denver (Colorado)
- University of Colorado (Colorado) *
- Western Connecticut State University (Connecticut)
- University of Delaware (Delaware)
- Howard University (Washington DC, District of Columbia)
- Florida State University (Florida) *
- University of Miami (Florida) *
- University of Georgia (Georgia)
- University of Hawaii at Manoa (Hawaii) *
- Boise State University (Idaho) *
- De Paul University Chicago (Illinois) *
- Illinois State University (Illinois) *
- Northwestern University (Illinois) *
- SIUE Department of Music (Illinois) *
- University of Illinois (Illinois) *
- De Pauw University (Indiana)
- Indiana University (Indiana) *
- University of Iowa (Iowa) *
- University of Northern Iowa (Iowa)
- Kansas State University (Kansas) *
- The Wichita State University (Kansas)

- Peabody Institute of the John Hopkins University (Maryland)
- Berklee College of Music (Massachusetts) *
- Boston University (Massachusetts) *
- Central Michigan University (Michigan) *
- Interlochen Arts Academy (Michigan) *
- The University of Michigan (Michigan)
- Wayne State University (Michigan)
- Bethel College (Minnesota) *
- University of Minnesota (Minnesota) *
- Delta State University (Mississippi) *
- The University of Southern Mississippi (Mississippi) *
- Central Missouri State University (Missouri)
- Southwest Missouri State University (Missouri) *
- University of Nebraska at Lincoln (Nebraska)
- University of New Hampshire (New Hampshire)
- Mason Gross School of the Arts (New Jersey) *
- Glassboro State College (New Jersey)
- The Crane School of Music, State University of New York (New York)
- Manhattan School of Music (New York)
- University of Rochester (New York)
- State University of New York, College at Fredonia (New York)
- Atlantic Christian College (North Carolina)
- North Carolina School of the Arts (North Carolina) *
- The University of North Carolina at Greensboro (North Carolina) *
- Bowling Green State University (Ohio) *
- Kent State University (Ohio) *
- University of Cincinnati (Ohio) *
- University of Northern Ohio
- Oklahoma State University (Oklahoma) *
- The University of Oklahoma, Norman (Oklahoma) *
- University of Oregon (Oregon) *
- Duquesne University (Pennsylvania)
- Indiana University of Pennsylvania (Pennsylvania) *
- Mansfield University (Pennsylvania)
- Temple University, Esther Boyer College of Music (Pennsylvania) *
- Bob Jones University (South Carolina) *
- University of Tennessee at Knoxville (Tennessee)
- Baylor University (Texas) *
- University of Houston (Texas) *
- University of Texas at San Antonio (Texas) *
- West Texas State University (Texas)
- Brigham Young University (Utah)
- The University of Vermont (Vermont) *
- Norfolk State University (Virginia)
- University of Washington (Washington) *
- Marshall University (West Virginia)
- University Wisconsin-Eau Claire (Wisconsin) *
- University of Wisconsin Milwaukee (Wisconsin)

N = 53 (The total number of asterisks is less than 53 because some universities received more than one questionnaire.)

APPENDIX G

QUESTIONNAIRE: RESULTS AND RESPONDENTS' COMMENTS[1]

Question One

Name of University/School of Music where you teach?

The total number of lecturers who completed the questionnaire (representative of all three countries) was 134 (45%). Five of these questionnaires were received back after the calculations had been done and were not taken into account. The actual sum of questionnaires that was used in the calculations therefore was 129 (43%). The response rates for the individual countries were as follows:

- RSA (South Africa) 7 (54%)
- FRG (Germany) 69 (45%)
- USA (United States of America) 53 (40%)
- ALL (Overall response rate) 129 (43%)[2]

Question Two

At your University/School of Music is Aural Training offered as
(a) a separate subject/course?
(b) part of the Music Theory classes?
(c) part of...?
(e.g. rhythmic education, dance training etc.)

Table 1 Response frequencies for Question Two

	RSA	FRG	USA	ALL
(a)	6 (85.7%)*	53 (76.8%)	38 (71.7%)	97 (75.1%)
(b)	2 (28.6%)	29 (42.1%)	14 (26.4%)	45 (34.9%)
(c)1	0 (0%)	1 (1.4%)	2 (3.8%)	3 (2.3%)
(d)2	1 (14.3%)	14 (20.3%)	1 (1.9%)	16 (12.4%)
Missing cases:	0 (0%)	1 (1.4%)	0 (0%)	1 (0.8%)
	N = 7	N = 69	N = 53	N = 129

(* The first number indicates the frequency of responses (in this case 6) followed by the percentage in brackets (in this case 85.7%). This pattern is followed in all Tables. The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 One German respondent indicated that Aural Training also formed part of a rhythmic education course at *Musikhochschulen*. Two American lecturers indicated that Aural Training formed part of a Comprehensive Musicianship class.

2 Percentages of respondents who indicated both (a) and (b).

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1 Short Afrikaans and German comments were translated into English. Duplicated answers appear only once. In cases where comments were not statistically interpreted as percentages, the nationality of the respondent making a certain comment appears in brackets.

2 These abbreviations are used in the rest of the text.

Question Three

Do you see Aural Training as (please indicate only one answer)
(a) a subject that mainly supports instrumental, singing and music theory courses? (as a subsidiary subject)
(b) a subject with its own aims? Which aims? (Only brief words please)..

Table 2 Response frequencies for Question Three

	RSA	FRG	USA	ALL
(a)	4 (57.1%)	31 (45%)	22 (41.5%)	57 (44.2%)
(b)	3 (42.9%)	37 (53.6%)	31 (58.5%)	71 (55%)
Missing cases:	0 (0%)	1 (1.4%)	0 (0%)	1 (0.8%)
	N = 7	N = 69	N = 53	N = 129

The brief comments of Question Three (b) were placed into ten different categories:

The development of structural hearing: Cognizant analytical hearing; Recognition of musical cohesion; Structural meaning of material; Aural analysis as a subject with its own status - verbalising and embodying (to objectify) the estimated impression ("Verbalisierung u. Objektivierung d. flüchtigen Höreindrucks"); Development of structural criteria through hearing/also non-schematic perception of New Music; Recognition of form schemes; Conscious understanding of musical relationships in detail and in larger form schemes; Recognition of compositional and historical attributes; Means of developing organization; Schooling of analytical and intuitive hearing; To process sound as meaningful patterns.

The development of inner hearing: To develop the "hearing eye" and "seeing ear"; It should help musicians to internalise music; Improvement of interrelations of notation and sound; Awareness of sound imagination; Being able to look at music and hear it, to hear music and be able to write it down; Development of imagination; To create a musician who can function without an instrument; To think sound, to hear it mentally, to listen with an "inner ear'; To aid the visual-aural perception of music.

The development of hearing strategies/hearing patterns: Development of hearing strategies; Availability of thinking patterns; Systematic work-through of the musical elements; Schooling in applying learning patterns; Development of musical memory, coordination, concentration.

Statement: Aural Training is the basis of all musical activities: Aural Skills are fundamental to all aspects of active musical performance. After all, music is by definition, an "aural" art!; It controls the entire perception of music; Aural training is a central part/most important part of any musician's training; Aural Training is significant in every aspect (performance or evaluation) of music; Ear Training is the basis of all reading and writing. Without it, communication is almost impossible; The ability to hear has to do with the whole human being, his personality in the broadest sense.

The development of musical understanding: To improve musical understanding, Conscious hearing, Musical sense; Trains knowledgeable listening; The essence of musicianship is involved in the mental integration of sound, symbol and label.

The development of musical perception: Improve music perception; Sensitization of the ear with reference to all the musical parameters; Sharpen recognition skills; To fine-tune discriminatory ability; Schooling of musical perceptive consciousness; Control over sound influences on the musical ear.

The development of musical literacy: To improve musicianship; To learn the language of music expressed through sound; An increase in musical awareness, sensitivity to musical experience, for listeners/performers; Development of music literacy; Development of musical independence; Development of creative abilities through hearing; Intensify aural acuity.

The development of practical skills: Sight-singing, score reading, pitch-tuning, timbre, pitch and rhythm discrimination, error detection, correction listening, intonation, performance skills with other students, reproduction of what is heard, harmonic discrimination, discrimination between major and minor, evaluation skills etc., recognition of intervals, sensitivity to the tonal system, dictation and playing what has been heard, reproduction of what has been heard, either vocally, verbally or in written keyboard form, evaluative hearing - ability to criticise.

To also support other music courses: Theory and Ear Training are "co-requisites" but the contents are not the same. Ear Training moves at a slower pace; A tough question to answer as it is, to me, both aims. However, (b) perhaps comes out on top; Aural Training will always be related to the musical practice, and in the same way to theory. That is why I fought (successfully) against this distinction between "Theory" on the one hand, and "Aural Training" on the other hand. I am principally against the education of "desk-drawer-thinking"; Does support performance and theory; In a sense, that is a supporting role to one's career; ... of course this should lead to the goals in (a) above; Thus it supports/is basis to serious study of music; Aural Training forms the basis for other subjects, and other subjects form the basis for Aural Training. Why (a) or (b)?; I cannot divide (a) and (b); I cannot separate the two. Structural understanding of music as mental procedure will always support special instruction e.g. technical support for performances as well as in interpretative matters According to (a): Hearing is biased in the field of Music Theory through historically influenced errors ("Root-hearing"). According to (b): Hearing as subject with its own aims should be seen as a corrective of (a), but needs a Music Theoretical historical basis. Both (a) and (b) require each other.

Other: Other specific aims and remarks that do not necessarily deal with aims, were put in this category: The shaping of the aural ability in the direction of music esthetics (FRG); Practice of music therapy (FRG); Consonance-dissonance problem (FRG); I do not see Aural Training as a subject with its own aims. It is always at the service of music and music research (RSA); Main subject: Aural Training ("Hörerziehung") (FRG); Aural Training can have its own purposes for a few people who would like to develop Aural Training in a scientific way (FRG); "Basis subject, such as harmony and counterpoint. In contrast to harmony and counterpoint that work with the brain and manuscript paper, (pardon - this is very much shortened!) Aural Training is dependent on perception only (FRG); It sometimes happens that I construct my music theory teaching only through hearing (FRG); To enable each student to reach the optimum in his hearing ability (USA); Development of personal aural skills (I describe it as a "3rd instrument to be practised daily) (RSA); Aural Training's aim is to develop the musical ear (FRG).

Table 3 Response frequencies for Question Three (b)

	RSA	FRG	USA	ALL
Structural hearing:	0 (0%)	**17 (45.9%)**	3 (9.7%)	20 (28.2%)
Inner hearing:	0 (0%)	8 (21.6%)	11 (35.5%)	19 (26.8%)
Hearing strategies/patterns:	0 (0%)	9 (24.3%)	2 (6.5%)	11 (15.5%)
Basis of all musical activities:	0 (0%)	3 (8.1%)	5 (16.1%)	8 (11.3%)
Musical understanding:	0 (0%)	12 (32.4%)	5 (16.1%)	17 (23.9%)
Musical perception:	**2 (66.7%)**	6 (16.2%)	9 (29%)	17 (23.9%)
Musical literacy:	1 (33.3%)	3 (8.1%)	7 (22.6%)	11 (15.5%)
Practical skills:	0 (0%)	4 (10.8%)	9 (29%)	13 (18.3%)
Support:	0 (0%)	13 (35.1%)	**13 (41.9%)**	**26 (36.6%)**
Other:	1 (33.3%)	11 (29.7%)	7 (22.6%)	19 (26.8%)
Missing cases:	0 (0%)	1 (2.7%)	0 (0%)	1 (1.4%)
	N = 3	N = 37	N = 31	N = 71*

(* N = 3, 37, 31, 71: Percentages were calculated taking into account only the respondents who indicated (b), and not both (a) and (b). The cumulative frequencies exceed the value of 100% because of multiple indications.)

Question Four

How much time is available weekly for teaching Aural Training per student?..

Table 4 Response frequencies for Question Four

	RSA	FRG	USA	ALL
30 min	0 (0%)	11 (15.9%)	0 (0%)	11 (8.5%)
45 min	0 (0%)	11 (15.9%)	1 (1.9%)	12 (9.3%)
60 min	**2 (28.6%)**	**41 (59.4%)**	1 (1.9%)	**44 (34.1%)**
120 min	1 (14.3%)	8 (11.6%)	**27 (50.9%)**	36 (27.9%)
180 min	0 (0%)	2 (2.9%)	16 (30.2%)	18 (14%)
300 min	0 (0%)	0 (0%)	4 (7.5%)	4 (3.1%)
Other	1 (14.3%)	3 (4.3%)	2 (3.8%)	6 (4.7%)
Missing cases:	3 (42.9%)	1 (1.4%)	4 (7.5%)	8 (6.2%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% in some cases because of multiple indications. Some respondents indicated that freshmen and sophomore students have different time schedules.)

A few respondents made **additional comments** on the question: Depends on subject/s in which the students major (FRG); X minutes plus computer time (USA); X minutes plus extra X minutes class for preparing for the final examination in Aural Training (FRG); X minutes, but the students can take more than one course at a time (FRG); X minutes for Ear training and X minutes for Sight singing (USA); X minutes available for freshmen and X minutes available for sophomores (USA); Additional dictation courses available (FRG); X minutes for individual instruction plus additional seminars which can be freely chosen by the students (FRG); Integrated in the Music theory teaching of X minutes (USA); X minutes plus some individual time (USA); X minutes per week in classes that may vary from 5 to 40 students (USA); Five times X minutes classes per week (USA); Varies - We have flexible scheduling (USA).

Question Five

The available time for teaching Aural Training is
(a) sufficient
(b) not sufficient

Table 5 Response frequencies for Question Five

	RSA	FRG	USA	ALL
(a)	**4 (57.1%)**	**34 (49.3%)**	12 (22.6%)	50 (38.8%)
(b)	2 (28.6%)	28 (40.6%)	**39 (73.6%)**	**69 (53.5%)**
(c)[1]	1 (14.3%)	5 (7.2%)	1 (1.9%)	7 (5.4%)
Missing cases:	0 (0%)	2 (2.9%)	1 (1.9%)	3 (2.3%)
	N = 7	N = 69	N = 53	N = 129

1 Varies: for some students sufficient (good students) and for weaker students insufficient.

Comments by FRG respondents indicated that the time is sufficient regarding the following: For the requirements of the syllabus; Over a period of six semesters; When prospective students are well prepared and when they are willing to work together with the lecturer; Sufficient: the study load of the student should also be taken into account!

Other comments regarding "Not sufficient" responses were: Not sufficient for students with inadequate entrance preparation (FRG); Not sufficient in sophomore year; (USA) It's never sufficient unless on a daily basis (RSA); This is a complicated issue. The time is insufficient to give most, but not all, students a true mastery of the skills we are trying to promote in the courses themselves, term by term. But some students are actually able to achieve mastery in a much shorter time. For them, however, there is insufficient time to carry them to a true mastery of aural skills, hearing large-scale forms and key relationships, four-part polyphony, etc. (USA); Never enough (USA); Not ideally sufficient (USA); Never sufficient but practical (USA); We are planning flexible instruction time - Brass and percussion students need more Aural Training - (They most often have the weakest ears!) (FRG).

Question Six

Do you have assistants in Aural Training to help weaker students?
(a) Yes
(b) No

Table 6 Response frequencies for Question Six

	RSA	FRG	USA	ALL
(a)	3 (42.9%)	23 (33.3%)	**31 (58.5%)**	57 (44.2%)
(b)	**4 (57.1%)**	**43 (62.3%)**	22 (41.5%)	**69 (53.5%)**
Missing cases:	0 (0%)	3 (4.3%)	0 (0%)	3 (2.3%)
	N = 7	N = 69	N = 53	N = 129

Reasons for not having teaching assistants based on respondents' comments: Financial reasons (FRG); Repetition of course possible (FRG); The Aural Training instruction is organized in achievement groups. Individual extra instruction for weak students is done by us according to our schedules. We are only two colleagues! (FRG); Each instructor does his or her own extra drill (USA); Computer-based reinforcement (FRG and USA).

Table 7 Cross-relationships between Questions six (a), Twenty (a) and (b)

RSA	FRG	USA	ALL
Respondents who made use of CAT but excluded NCAT			
0 (0%)	1 (1.4%)	15 (28.3%)	16 (12.4%)
Respondents who made use of NCAT but excluded CAT			
2 (28.6%)	25 (36.2%)	8 (15.1%)	35 (27.1%)
Respondents who made use of teaching assistants but excluded NCAT and CAT			
0 (0%)	6 (8.7%)	8 (15.1%)	14 (10.9)
Respondents who indicated neither teaching assistants nor NCAT/CAT			
2 (28.6%)	19 (27.5%)	6 (11.3%)	27 (20.2%)
Respondents who indicated either teaching assistants and/or NCAT/CAT			
5 (71.4%)	50 (72.3)	47 (88.7)	102 (79.1%)
N = 7	N = 69	N = 53	N = 129

Question Seven

Do you teach Aural Training in
(a) classes limited to one student (individual tuition)?
(b) classes made up of groups of students (group tuition)?

Table 8 Response frequencies for Question Seven

	RSA	FRG	USA	ALL
(a)	0 (0%)	2 (2.9%)	0 (0%)	2 (1.6%)
(b)	**7 (100%)**	**55 (79.7%)**	**51 (96.2%)**	**113 (86%)**
(c)[1]	0 (0%)	11 (15.9%)	2 (3.8%)	13 (10.1%)
Missing cases:	0 (0%)	1 (1.4%)	0 (0%)	1 (0.8%)
	N = 7	N = 69	N = 53	N = 129

1 Percentages of respondents who indicated both (a) and (b).

Question Eight

If you have indicated group Aural Training, what is (are) the size(s) of the group(s)?..............................

Table 9 Response frequencies for Question Eight

	RSA	FRG	USA	ALL
2[1]	0 (0%)	10 (15.2%)	2 (3.8%)	12 (9.5%)
3-4	0 (0%)	10 (15.2%)	4 (7.5%)	14 (11.1%)
5-6	**3 (42.9%)**	**21 (31.8%)**	2 (3.8%)	26 (20.6%)
7-8	2 (28.6%)	10 (15.2%)	0 (0%)	12 (9.5%)
9-10	**3 (42.9%)**	15 (22.7%)	8 (15.1%)	26 (20.6%)
11-12	0 (0%)	3 (4.5%)	10 (18.9%)	13 (10.3%)
13-15	2 (28.6%)	10 (15.2%)	**17 (32.1%)**	**29 (23%)**
16-20	2 (28.6%)	6 (9.1%)	14 (26.4%)	22 (17.5%)
21-30	2 (28.6%)	0 (0%)	5 (9.4%)	7 (5.6%)
31-40	0 (0%)	1 (1.5%)	1 (1.9%)	2 (1.6%)
41-100+	0 (0%)	0 (0%)	3 (5.7%)	3 (2.4%)
Missing cases:	0 (0%)	3 (4.5%)	0 (0%)	3 (2.4%)
	N = 7	N = 66	N = 53	N = 126

(* N = 7, 66, 53, 126: Percentages were calculated taking into account the respondents who indicated only Seven (b) as well as Seven (a) and (b). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Number of students per group: Where respondents indicated more than one group, averages were calculated when the group sizes were more or less the same. In cases where the differences between the indicated group sizes were extreme, e.g. 2 and 15, both sizes were taken into account.

General comments made by some respondents revealed that different tasks required different group sizes: 5 for sightsinging (USA); 4-6 (oral assignments), 20 (written assignments) (RSA); 15 in a seminar group preparing for the final examination (FRG); 15 for dictation (USA); 10 for Aural Analysis (FRG); 4-5 (solfège); 10-30 (written assignments) (FRG); 2-12 (e.g. for dictation and Aural Analysis seminars (FRG); 30 students - seminars; 15 students - smaller group; 5 students - "demi" groups led by teaching assistant (RSA).

It was also mentioned that the degree of achievement influenced the size of the group: 2 students on the same level (FRG); At the maximum 3 participants. This is, however, not always possible because of different achievement levels (FRG); Number of students per group depends on the achievement levels (Elementary level 1, Elementary level 2, Intermediate level 1, Intermediate level 2, Advanced level 2, Advanced level 2) The highest two levels are for the students majoring in Conducting, Composition and Choir repetition with only a few students per group (less than eight) (FRG).

Cross-relationships between Questions Four and Eight (time available and group sizes) are summarized in the following Tables. Categories are combined in order to simplify the calculation processes.

Table 10 Cross-relationships between Questions Four and Eight: RSA

	Instruction time in minutes			
	60	120	180	300
Group sizes				
6	0 (0%)	1 (1.4%)	0 (0%)	0 (0%)
7-10	**2 (28.6%)**	1 (1.4%)	0 (0%)	0 (0%)
13-20	1 (1.4%)	0 (0%)	0 (0%)	0 (0%)
21-30	1 (1.4%)	1 (1.4%)	0 (0%)	0 (0%)
	N = 7			

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

Table 11 Cross-relationships between Questions Four and Eight: FRG

	Instruction time in minutes				
	30	45-60	120	180	300
Group sizes					
2-6	10 (14.5%)	**30 (43.5%)**	4 (5.8%)	2 (2.9%)	0 (0%)
7-12	4 (5.8%)	24 (34.8%)	2 (2.9%)	0 (0%)	0 (0%)
13-20	4 (5.8%)	13 (18.8%)	0 (0%)	1 (1.4%)	0 (0%)
21-30	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 69				

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

Table 12 Cross-relationships between Questions Four and Eight: USA

	Instruction time in minutes				
	30	45-60	120	180	300
Group sizes					
2-6	0 (0%)	0 (0%)	4 (7.5%)	2 (3.8%)	0 (0)%
7-12	0 (0%)	1 (1.9%)	9 (17%)	5 (9.4%)	2 (3.8%)
13-20	0 (0%)	1 (1.9%)	**17 (32.1%)**	9 (17%)	2 (3.8%)
21-30	0 (0%)	0 (0%)	2 (3.8%)	2 (3.8%)	1 (1.9%)
30+	0 (0%)	0 (0%)	1 (1.9%)	2 (3.8%)	1 (1.9%)
	N = 53				

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

Question Nine

Do you prefer
(a) individual Aural Training?
(b) group Aural Training?
(c) individual and group Aural Training?

Table 13 Response frequencies for Question Nine

	RSA	FRG	USA	ALL
(a)	0 (0%)	6 (8.7%)	0 (0%)	6 (4.7%)
(b)	**4 (57.1%)**	**35 (50.7%)**	13 (24.5%)	52 (40.3%)
(c)	3 (42.9%)	26 (37.7%)	**40 (75.5%)**	**69 (53.3%)**
Missing cases	0 (0%)	2 (2.9%)	0 (0%)	2 (1.6%)
	N = 7	N = 69	N = 53	N = 129

Question Ten

In your opinion, what is the ideal size of a group?...

Table 14 Response frequencies for Question Ten

	RSA	FRG	USA	ALL
1[1]	0 (0%)	3 (4.3%)	1 (1.9%)	4 (3.1%)
2-3	0 (0%)	12 (17.4%)	1 (1.9%)	13 (10.1%)
4	0 (0%)	14 (20.3%)	2 (3.8%)	16 (12.2%)
5-6	**3 (42.9%)**	**23 (33.3%)**	6 (11.3%)	**32 (24.8%)**
7-8	2 (28.6%)	4 (5.8%)	6 (11.3%)	12 (9.3%)
9-10	0 (0%)	1 (1.4%)	**16 (30.2%)**	17 (13.2%)
11-12	1 (14.3%)	1 (1.4%)	14 (26.4%)	16 (12.4%)
13-15	0 (0%)	0 (0%)	6 (11.3%)	6 (4.7%)
16-20	0 (0%)	1 (1.4%)	0 (0%)	1 (0.8%)
(a)[2]	2 (28.6%)	5 (7.2%)	2 (3.8%)	9 (7%)
Missing cases	0 (0%)	9 (13%)	1 (1.9%)	10 (7.8%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications. In some cases respondents suggested different group sizes for different tasks.)

1 Number of students per group
2 Some of the respondents indicated that the number of students per group depended on factors such as the personalities of the students, the level of development and the task at hand.

Question Eleven

Which of the following work processes do you incorporate in your Aural Training?
(a) Body movements
(i) Hand signs (Tonic doh)
(ii) Indication of meter/beat
(iii) Other movements..
(b) Singing (from memory) material that was heard
(c) Clapping (from memory) material that was heard
(d) Playing (from memory) on keyboard instruments, material that was heard
(e) Playing (from memory) on other instruments, material that was heard
(f) To clap rhythms from sight
(g) Sight Singing
(h) Dictation
(i) Discrepancy listening tasks: to point out differences between the written music and what has been heard
(j) Improvisation
(k) Graphic representation of broad overview/details of what was heard
(l) Verbal descriptions on what has been heard:
(i) making use of music theory terminology
(ii) self-developed terminology (e.g. associations)
(m) Other methods..

Table 15 Response frequencies for Question Eleven

	RSA	FRG	USA	ALL
(a)1	2 (28.6%)	10 (14.5%)	5 (9.4%)	17 (13.2%)
(a)2	5 (71.4%)	24 (34.8%)	32 (60.4%)	61 (47.3%)
(a)3[1]	0 (0%)	3 (4.3%)	3 (5.7%)	6 (4.7%)
(a)4[2]	2 (28.6%)	2 (2.9%)	2 (3.8%)	6 (4.7%)
(b)	**7 (100%)**	58 (84.1%)	40 (75.5%)	105 (81.1%)
(c)	5 (71.4%)	47 (68.1%)	25 (47.2%)	77 (59.7%)
(d)	5 (71.4%)	36 (52.2%)	12 (22.6%)	53 (41.1%)
(e)	2 (28.2%)	11 (15.9%)	7 (13.2%)	20 (15.5%)
(f)	**7 (100%)**	50 (72.5%)	41 (77.4%)	98 (76%)
(g)	**7 (100%)**	**60 (87%)**	**53 (100%)**	**120 (93%)**
(h)	**7 (100%)**	**63 (91.3%)**	**52 (98.1%)**	**122 (94.6%)**
(i)	6 (85.7%)	46 (66.7%)	36 (67.9%)	88 (68.2%)
(j)	2 (28.6%)	24 (34.8%)	12 (22.6%)	38 (29.5%)
(k)	2 (28.6%)	21 (30.4%)	18 (34%)	41 (31.8%)
(l)i	6 (85.7%)	55 (79.7%)	37 (69.8%)	98 (76.6%)
(l)ii	2 (28.6%)	22 (31.9%)	4 (7.5%)	28 (21.7%)
(m)i[3]	1 (14.3%)	5 (7.2%)	0 (0%)	6 (4.1%)
(m)ii[4]	1 (14.3%)	5 (7.2%)	1 (1.9%)	7 (5.4%)
(m)iii[5]	0 (0%)	6 (8.7%)	0 (0%)	6 (4.7%)
(m)iv[6]	3 (42.9%)	11 (15.9%)	4 (7.5%)	18 (14%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Conducting/free gestures
2 Other movements
3 Transposition
4 Aural Analysis
5 Imagination tasks
6 Other methods

The brief comments of the respondents were analysed and presented in these six categories (see 1-6 above):

Conducting, making use of free gestures: As one respondent put it, to "paint" figures in the air by using the hands; To indicate pitches; Dalcroze Eurhythmics; General Contour by vertical hand position; gestures/movements for interval, harmony, etc.

Other body movements: Clapping, walking, dance; Handsigns: Jale; Hand signs - not Kodály;[3] Body movements integrating chords.

Transposition: To sing (using letter names) or play a musical phrase in a different key than written.

Aural analysis; Analysis of piano works at the piano; To hear bigger and "superposed" relationships; To determine style, form and instrumentation making use of aural analytical procedures.

Imagination: Test inner hearing through singing or hearing; using the score as a way of developing inner hearing; To think a piece of music through silently; To listen "backwards" (critical hearing), "forwards" (anticipational hearing).

Other methods: Rote recitation of solffeggio syllables in rhythm (USA); To play rhythms on own instrument instead of clapping them (RSA); Combine hands, feet and voice (RSA); Composition - completion of antecedent-consequent phrases in a written form or through improvisation (FRG); To repeat what was heard and to improvise on this material (FRG); Transcription from recordings, familiar melodies (USA); Interval recognition (ALL); Combination of theoretical knowledge and practical experience, e.g. four-part harmony: SAB are dictated. Tenor should be composed according to four-part harmony theory rules. The concrete example is once more played in order to check and correct tenor (FRG); Memory exercises (FRG); To play one or more voices while singing another voice (FRG); Recognition of chords (ALL); Memorizing melodic/rhythmic patterns (USA); To sing modulation exercises e.g. the last notes of a phrase form the beginning notes of the next phrase (FRG); Singing paradigm structures (chords, intervals, scales) (USA); Timbre discrimination (ALL); Sight reading on xylophones (USA); Hohlfeld System of Aural Training (FRG).

General comments on the given methods: To sing/intone rhythms (ALL); Echo - phrases (USA); Improvisation is only possible with smaller groups or individual students (FRG); Generally I prefer complex exercises, combining more than one exercise (FRG); Verbal description: also poetical language and colloquial speech (FRG); A few respondents indicated that they required the students to indicate the meter while they are singing (ALL).

Question Twelve

Which method(s) do you use in the development of the mental representation of pitch?
(a) Absolute solmization (fixed doh)
(b) Tonic doh method (relative doh)
(c) Absolute note names (C, D, Es, Fis,..)
(d) Sing on syllables (la, la,..)
(e) Other...

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3 Results from the survey conducted at the *Institute for Music Theory Pedagogy Studies II* revealed that 9% of the respondents made use of Kodály hand signals (signs) in conjunction with sight singing classes. Sixty-nine percent indicated that they used a conducting pattern in conjunction with sight singing. Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 251.

Table 16 Response frequencies for Question Twelve

	RSA	FRG	USA	ALL
(a)	1 (14.3%)	4 (5.8%)	10 (18.9%)	15 (11.6%)
(b)	**5 (71.4%)**	18 (26.1%)	**34 (64.2%)**	57 (44.2%)
(c)	**5 (71.4%)**	**54 (78.3%)**	16 (30.2%)	**75 (58.1%)**
(d)	**5 (71.4%)**	21 (30.4%)	23 (43.4%)	49 (38%)
(e)i[1]	1 (14.3%)	3 (4.3%)	18 (34%)	22 (17.1%)
(e)ii[2]	1 (14.3%)	1 (1.4%)	4 (7.5%)	6 (4.7%)
(e)iii[3]	1 (14.3%)	12 (17.4%)	1 (1.9%)	14 (10.9%)
Missing cases:	0 (0%)	5 (7.2%)	1 (1.9%)	6 (4.7%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 **Numbers to represent tonal scale degrees:** (Tonic is "1", supertonic is "2", etc. in both major and minor keys). One respondent indicated that he used numbers especially for triadic representations (1-3-5-8), whereas another lecturer indicated that he used numbers if the students needed remedial work.

2 ***Tonic doh* with minor starting on *doh* instead of *lah*.**

3 Other methods: Nü-method by P. Koch (FRG), Jale system (FRG), Scat singing (FRG), Singing with the support of chords (FRG), Work by interval (USA), Chord symbols (USA), Kinetic/Keyboard, Listen while following the score; We use a modified moveable Do in singing but do not require students to learn or use the syllables, though many do so (USA); Absolute note names - for alto and tenor clefs (USA).

Other general comments: A German respondent maintained that he could lead students with a latent perfect pitch ability to hear absolute pitch by means of memory exercises. He had approx. 30% success. Two other Germans indicated that they made use of absolute note names but made students aware of the inner tensions present in the scale, i.e. the relation to the tonic note, thus being able to hear relatively in an absolute sphere.

Table 17 Number of Sight Singing methods used per lecturer

	RSA	FRG	USA	ALL
1 method	1 (14.3%)	26 (40.6%)	**20 (38.5%)**	**47 (38.2%)**
2 methods	**2 (28.6%)**	**28 (43.7%)**	16 (30.8%)	46 (37.4%)
3 methods	**2 (28.6%)**	9 (14.1%)	11 (21.1%)	22 (17.9%)
4 methods	**2 (28.6%)**	1 (1.6%)	4 (7.7%)	7 (5.7%)
5 methods	0 (0%)	0 (0%)	1 (1.9%)	1 (0.8%)

Question Thirteen

Do you use published textbooks/workbooks in your Aural Training?

(a) Yes

(b) No

Table 18 Response frequencies for Question Thirteen

	RSA	FRG	USA	ALL
(a)	**7 (100%)**	**47 (68.1%)**	**45 (84.9%)**	**99 (76.7%)**
(b)	0 (0%)	18 (26.1%)	7 (13.2%)	25 (19.4%)
Missing cases:	0 (0%)	4 (5.8%)	1 (1.9%)	5 (3.9%)
	N = 7	N = 69	N = 53	N = 129

Question Fourteen

If Yes, which textbooks/workbooks? (Author(s), title(s), publisher and year of publication)........................

Table 19 Response frequencies for Question Fourteen

	RSA	FRG	USA	ALL
Benward	0 (0%)	1 (2.1%)	10 (22.2%)	11 (11.1%)
Berkowitz et al.	2 (28.6%)	0 (0%)	**12 (26.7%)**	14 (14.1%)
Breuer	0 (0%)	3 (6.4%)	0 (0%)	3 (3%)
Dannhauser	0 (0%)	0 (0%)	3 (6.7%)	3 (3%)
M. Vetus	0 (0%)	1 (2.1%)	1 (2.2%)	2 (2%)
M. Novus	1 (14.3%)	15 (31.9%)	2 (4.4%)	18 (18.2%)
Grabner	0 (0%)	9 (19.1%)	0 (0%)	9 (9.1%)
Hindemith	1 (14.3%)	0 (0%)	2 (4.4)	3 (3%)
Kühn	1 (14.3%)	8 (17%)	0 (0%)	9 (9.1%)
Mackamul	**3 (42.9%)**	**31 (65.6%)**	0 (0%)	34 (34.3%)
Ottman	0 (0%)	0 (0%)	10 (22.2%)	10 (10.2%)
Quistorp	0 (0%)	9 (19.1%)	0 (0%)	9 (9.1%)
Schenk	0 (0%)	6 (12.8%)	0 (0%)	6 (6.1%)
Starer	0 (0%)	0 (0%)	3 (6.7%)	3 (3%)
Trubitt et al.	0 (0%)	0 (0%)	3 (6.7%)	3 (3%)
V/d Horst	2 (28.6%)	3 (6.4%)	0 (0%)	5 (5.1%)
Other	4 (57.1%)	18 (38.3%)	13 (28.9%)	35 (35.4%)
Missing cases:	0 (0%)	4 (8.5%)	1 (2.2%)	5 (5.1%)
	N = 7	N = 47	N = 45	N = 99*

(* N = 7, 47, 45, 99: Percentages were calculated taking into account only the respondents who indicated Thirteen (a). The cumulative frequencies exceed the value of 100% because of multiple indications.)

All the books that were indicated by more than two respondents appear in Table 20. Due to the fact that many respondents did not give exact details of the book(s) that they used, all the books on Aural Training by a specific author listed in the *Blackwell North American Catalogue*, the *National Union Catalogue* and the *Deutsche Bibliographie* appear below:

Benward, Bruce: **Workbook in Advanced Ear Training - Teachers Dictation Manual.** Dubuque, Iowa: Wm.C. Brown, 1961.
Workbook in Advanced Ear Training. Dubuque, Iowa: Wm.C. Brown, 1961.
Sightsinging Complete. Dubuque, Iowa: Wm.C. Brown, 1973.
Ear Training: A Technique for Listening. Dubuque: Wm.C. Brown, 1978.
Elementary Ear Training. Dubuque, Iowa: Wm.C. Brown, 1983.

Berkowitz, Sol, Gabriel Fontrier and Leo Kraft: **A New Approach to Sight Singing.** New York: W.W. Norton, 1976Rev. ed. (Third ed. 1986 also available.)

Breuer, Wolfgang: **Gehörbildung**. Stuttgart: Metzler, 1990.

Dannhauser, A., L. Lemoine and A. Lavignac: **Solfège des Solfège (Vols.1a, 2a, 3a, 4a)**. Paris: Bruxelles, 1910.

Edlund, Lars: **Modus Vetus - Sight Singing and Ear Training in Major/Minor Tonality.** New York: A Broude, 1974. (Translation revised by Alan Stout. Originally published by Nordiska, Stockholm. [Foreword 1966]

Modus Novus - Studies in Reading atonal melodies. London: J. & W. Chester, [Foreword 1963].

Grabner, Hermann: **Neue Gehörübungen.** Berlin: Max Hesses, 1962.

Hindemith, Paul: **Unterweisung im Tonsatz.** Mainz: Schott, 1940. (**Elementary Training for Musicians.** New York: Associated Music Publishers, 1949.)

Kühn, Clemens: **Gehörbildung im Selbststudium.** Kassel, Bärenreiter, 1983.

Mackamul, Roland: **Lehrbuch der Gehörbildung, Bänder 1 und 2.** Kassel. Bärenreiter, 1969.

Ottman, Robert W.: **Music for Sight Singing.** Englewood Cliffs, N.J.: Prentice-Hall, 1956[1st], 1967[2nd], 1986[3rd].
More Music for Sight Singing. Englewood Cliffs, N.J.: Prentice-Hall, 1981.

Quistorp, Monica: **Die Gehörbildung - Das Kernfach musikalischer Erziehung.** Wiesbaden: Breitkopf and Härtel, 1970.
Übungen zur Gehörbildung - Hefte 1 - 3 (Unterstufe, Mittelstufe, Oberstufe). Wiesbaden: Breitkopf and Härtel, 1974.

Schenk, Paul: **Grundbegriffe der Musik: Erster Lehrgang der Elementarmusiktheorie in 3 Heften.** Berlin: Kallmeyer, 1941.
Rhythmisches Musikdiktat. Leipzig: Pro Musica, 1950.
Schule der musikalischen Gehörbildung - Teil 1. Trossingen: Hohner, 1952.
Schule des musikalischen Hörens, Teil 1. Leipzig: Pro Musica, 1958.

Starer, Robert: **Rhythmic Training.** New York: MCA Music, 1969.

Trubitt, Allen R. and Robert S. Hines: **Ear Training and Sight-Singing - An Integrated Approach, Books 1 and 2.** New York: Schirmer Books, 1979 and 1980.

Van der Horst, F.: **Maat en Ritme Deel I en II.** Amsterdam: Broekmans and Van Poppel, 1963.

Other Books:

Associated Board of the Royal Schools of Music (ABRSM): **Aural Tests Parts I-III.** London: ABRSM, 1957.

Benjamin, Thomas, Michael Horvit and Robert Nelson: **Music for Sight Singing**. Boston: Houghton-Mifflin, 1984.

Bona, P.: **Rhythmical Articulation: A Complete Method.** New York: Carl Fischer, 1900.

Brühl, Karl W.: **Materialien zur Didaktik und Methodik des Musikunterrichts Band 6: Materialien zur Hörschulung.** Wiesbaden: Breitkopf and Härtel, 1978.

Busch, Siegfried: **Hörtraining I, II, III.** Rottenburg: Advance Music, 1987.

Dandelot, G.: **Namiel Pratique Pour Les Sept Cles.** Paris: Eschig, 1948. (English translation by Barbara King available from New England Conservatory of Music Library)

DeLone, Richard Pierre: **Literature and Materials for Sightsinging.** New York: Holt, Rinehart and Winston, 1981.

Fawcett, Brian: **Listening and Writing.** Harrap, 1981. (Exact details could not be found in either the Blackwell North American Catalogue or the National Union Catalogue.

Fish, Arnold and Norman Lloyd: **Fundamentals of Sight Singing and Ear Training**. New York: Dodd, Mead & Company, 1966.

Fischer, David J. and Nêst Harris: **Advanced Listening: Aural Perception for Students of A Level Music.** Harlow: Longman, 1986.

Freindling, G.: "**2-3 stg. Diktate**". Leningrad: Myzbika, 1970. (Exact details could not be found)

Growe, Edgar, Annie Lawton and Gillies W. Whittaker: **The Folk Song Sight Singing Series, Books 1-12.** London: Oxford, 1933.

Güldenstein, Gustav: **Gehörbildung für Musiker - Ein Lehrbuch.** Stuttgart: Schwabe, 1971.

Hall, Anne Carothers: **Studying Rhythm**. Englewood Cliffs, N.J.: Prentice Hall, 1989.

Holmberg, Mark L.: **Harmonic Reading.** Lanham, MI: University Press of America, 1983.

Illman, Michael: **Systematic Aural Training**. London: Longman, 1974.

Kolneder, Walter: **Singen - Hören - Schreiben,** 5 Hefte. Mainz: Schott, 1963.

Kral, Walter and Ivo Zopf: **Gehörbildung - Lehrgang für individuelles Selbststudium Band 1.** Vienna: Österreichischer Bundesverlag, 1989.

Levin, Robert D. and Louis Martin: **Sight Singing and Ear Training Through Literature.** Englewood Cliffs, N.J.: Prentice-Hall, 1988.

Loeb van Zuilenburg, Paul: **Gehooroefeninge.** Stellenbosch: AZ Uitgewers, Oranjelaan 14, 1988.

Löbner, Roland: **Gehörbildung**. Band 1, Unterrichtsbuch. Köln, Hans Gerig, 1968.

McCormick, Scott and Rick Packham: **Ear Training Workbooks I and II.** Berklee College of Music, 1989 and 1990.

McCullough, Mckinley, Patriquin: **Learn to Listen Vol 1 and 2**. Publication of the Music Faculty, McGill University, [n.d.]

Nketia J.H.: **Sight Reading based on African Music** (Ghana) (out of print). According to the Blackwell North American Catalogue Nketia did not write a Sight Reading book *per se*. He, however, wrote amongst other books also **African Music in Ghana** (Evanston Illinois: Northwestern University Press, 1963) in which songs are included, as well as **Folksongs of Ghana** (Legon: University of Ghana, 1963.). It can be that the respondent made use of these songs for sight singing purposes.

Patriquin, D.: **Listen carefully.** Publication of the Music Faculty, McGill University, [n.d.]

Plummer, Steve: **Workbooks for Solfége I an II.** Berklee College of Music, 1973 and 1975.

Riemann, Hugo: **Handbuch des Musikdiktats**. Berlin: Max Hesses, 1904.

Sekles, Bernhard: **Musikdiktat - Übungsstoff in dreißig Abschnitten.** Mainz, Schott, 1901.

Schmoll, Michael: **Arbeitshilfen zur Musiktheorie**. Iserlohn: Antenne, 1988. (This book could not be found in the *Deutsche Bibliographie* (German Bibliography)).

Steven, John R. and Marjorie D. Porterfield: **Rhythm and Pitch: An Integrated Approach to Sightsinging.** Englewood Cliffs, N.J.: Prentice-Hall, 1986.

Stones: **Rhythmic Training** (Exact details could not be found.)

Taylor, Eric: **A Method of Aural Training, Parts 1 and 2.** London: Oxford University Press, 1980.

Van Egmond, Marie: **Van't Blad Zingen, I and II.** Amsterdam: Broekmans and Van Poppel, [n.d.].

Van Egmond, Marie: **600 Dictees.** Amsterdam: Broekmans and Van Poppel, [n.d.].

Wittlich, Gary E. and Deborah S. Martin: **Tonal Harmony for the Keyboard.** New York: Schirmer, 1989.

Damschroder, David: Sight Singing and Ear Training texts. This will eventually be published by Schirmer Books.
Hayman, Dick: 100 Tunes every musician should know. (Exact details could not be found.)
Various Choir Books
I use approx. thirty different books, mainly from the Bulgarian publisher Nauka.
We use instructor-authorised packets for dictation.

Question Fifteen

What role do textbooks/workbooks play in your Aural Training? (Please indicate only one answer.)
(a) I base my teaching on textbooks/workbooks.
(b) I use textbooks/workbooks as inspiration and partially build my teaching on them.

This question was not taken into account when the calculations were done because, on second thoughts, it was not considered to be correctly formulated. The initial goal was to determine the influence of Aural Training literature on instruction. The question in this form however does not provide the information sought. It can be assumed that lecturers at tertiary institutions will not base their whole teaching method on one of two workbooks, but will use them as references only. This fact also emerged clearly in that all respondents, with one exception, indicated (b).

Question Sixteen

In Aural Training, do you use (please indicate only one answer)
(a) examples from the music repertoire only?
(b) self-composed exercises only?
(c) mainly examples from the music repertoire, with a few self-composed exercises?
(d) mainly self-composed exercises, with a few examples from the music repertoire?

Table 20 Response frequencies for Question Sixteen

	RSA	FRG	USA	ALL
(a)	0 (0%)	6 (8.7%)	4 (7.5%)	10 (7.8%)
(b)	0 (0%)	0 (0%)	1 (1.9%)	1 (0.8%)
(c)	**5 (71.4%)**	**40 (58%)**	20 (37.7%)	**65 (50.4%)**
(d)	1 (14.3%)	22 (31.9%)	**25 (47.2%)**	48 (37.2%)
(e)[1]	1 (14.3%)	1 (1.4%)	2 (3.8%)	4 (3.1%)
Missing cases:	0 (0%)	0 (0%)	1 (1.9%)	1 (0.8%)
	N = 7	N = 69	N = 53	N = 129

1 Extra category: 50% examples from the music repertoire, and the other 50% mainly self-composed examples.

Question Seventeen

Do you also include aural analysis in your Aural Training? (Analysis of works or parts of them by ear only through repeated listening, without the use of a score)
(a) Yes
(b) No

Table 21 Response frequencies for Question Seventeen

	RSA	FRG	USA	ALL
(a)	**5 (71.4%)**	**43 (62.3%)**	**40 (75.5%)**	**88 (68.2%)**
(b)	2 (28.6%)	26 (37.7%)	13 (24.5%)	41 (31.8%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 7	N = 69	N = 53	N = 129

Question Eighteen

If No, what are your reasons?
(a) I find that aural analysis is not easily put into practice.
(b) Aural analysis is an unknown field to me.
(c) Other reasons:..

Table 22 Response frequencies for Question Eighteen

	RSA	FRG	USA	ALL
(a)	0 (0%)	3 (11.5%)	**7 (53.8%)**	10 (24.4%)
(b)	0 (0%)	5 (19.2%)	3 (23.1%)	8 (19.5%)
(c)i1	0 (0%)	3 (11.5%)	3 (23.1%)	6 (14.6%)
(c)ii2	**1 (50%)**	**7 (27%)**	2 (15.4%)	10 (24.4%)
(c)iii3	**1 (50%)**	**7 (27%)**	4 (30.8%)	**12 (29.3%)**
(c)iv4	0 (0%)	3 (11.5%)	0 (0%)	3 (7.3%)
(c)v5	0 (0%)	2 (7.7%)	0 (0%)	2 (4.9%)
(c)vi6	0 (0%)	5 (19.2%)	3 (23.1%)	8 (19.5%)
Missing cases:	0 (0%)	1 (3.8%)	0 (0%)	1 (2.4%)
	N = 2	N = 26	N = 13	N = 41*

(* N = 2, 26, 13, 41: Percentages were calculated taking into account only the respondents who indicated Seventeen (b). The cumulative frequencies exceed the value of 100% in some cases because of multiple indications.)

1 **For advanced students only**
2 **Part of other subjects** such as History of Music Courses, Advanced Theory classes, "Contemporary Technique" classes, Form and Analysis classes.
3 **Too little time available**
4 **Students too weak - overestimated**
5 **Waste of time/Unnecessary**: We can analyse a short synoptic excerpt (e.g. eight measures) according to all parameters.
6 **Other reasons**: The gain in aural skills is too little, but is important for other music disciplines (FRG); Other skills are more important (ALL); Too many explanations are involved which take up precious teaching time (RSA); Our curriculum is so jammed with 'what-not' courses that we are forced to concentrate on essentials during the first three years. We do not have most of the music majors after that. (USA); I have not yet started with Aural Analysis (FRG); Aural Analysis in bigger groups seems to be difficult (FRG); Aural Analysis is only possible in combination with the score (FRG).

Question Nineteen

If aural analysis forms part of your tuition, which of the following style periods do you include?
(a) Renaissance
(b) Baroque
(c) Classic
(d) Romantic
(e) Late-Romantic
(f) Impressionism
(g) Music of the Twentieth Century until 1960
(h) Music after 1960
(i) Ethnical African Music
(j) Jazz
(k) Other..

Table 23 Response frequencies for Question Nineteen

	RSA	FRG	USA	ALL
(a)	2 (40%)	23 (53.5%)	9 (22.5%)	34 (38.6%)
(b)	**5 (100%)**	**42 (97.7%)**	**35 (87.5%)**	**82 (93.2%)**
(c)	**5 (100%)**	**43 (100%)**	**39 (97.5%)**	**87 (98.9%)**
(d)	**5 (100%)**	**41 (95.3%)**	**34 (85%)**	**80 (91%)**
(e)	2 (40%)	34 (79.1%)	20 (50%)	56 (63.6%)
(f)	4 (80%)	29 (67.4%)	14 (35%)	47 (53.4%)
(g)	4 (80%)	38 (88.4%)	21 (52.5%)	63 (71.6%)
(h)	3 (60%)	21 (48.8%)	6 (15%)	30 (34%)
(i)	4 (80%)	10 (23.3%)	4 (10%)	18 (20.1%)
(j)	3 (60%)	19 (44.2%)	16 (40%)	38 (43.2%)
(k)i[1]	1 (20%)	6 (14%)	3 (7.5%)	10 (11.4%)
(k)ii[2]	1 (20%)	3 (7%)	1 (2.5%)	5 (5.7%)
(k)iii[3]	0 (0%)	1 (2.3%)	2 (5%)	3 (3.4%)
(k)iv[4]	0 (0%)	4 (9.3%)	2 (5%)	6 (6.8%)
Missing cases:	0 (0%)	0 (0%)	1 (2.5%)	1 (1.1)
	N = 5	N = 43	N = 40	N = 88*

(* N = 5, 43, 40, 88: Percentages were calculated taking into account only the respondents who indicated Seventeen (a). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Pop Music (Fusion, American Pop, Rock)
2 Middle Ages (Ars Nova, Ars Antiqua, plainsong)
3 Self-composed
4 Other (Charts hits, Folklore, Ethnic Canadian Music, Raga, Gamalan, Japanese music)

Question Twenty

Concerning publications, communication and research on Aural Training didactics: (Please choose three of the following statements)
(a) There are enough articles on the didactics of Aural Training in music periodicals.
(b) I would like to see more articles published on Aural Training in music periodicals.
(c) Teachers of Aural Training have sufficient professional contact with each other.
(d) I would like to see more study groups and workshops on the didactics of Aural Training.
(e) Sufficient research is being done in the field of Aural Training.
(f) More research should be done in the field of Aural Training.

Table 24 Response frequencies for Question Twenty

	RSA	FRG	USA	ALL
(a)	0 (0%)	7 (10.1%)	6 (11.3%)	13 (10.1%)
(b)	**6 (85.7%)**	**37 (53.6%)**	**36 (67.9%)**	**79 (61.2%)**
(c)	0 (0%)	6 (8.7%)	1 (1.9%)	7 (5.4%)
(d)	**5 (71.4%)**	**38 (55.1%)**	**41 (77.4%)**	**84 (65.1%)**
(e)	0 (0%)	6 (8.7%)	5 (9.4%)	11 (8.5%)
(f)	**6 (85.7%)**	**43 (62.3%)**	**42 (79.2%)**	**91 (70.5%)**
Missing cases:	1 (14.3)	17 (24.6%)	3 (5.7%)	21 (16.3)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications.)[1]

1 Some respondents did not indicate three answers but only one or two. Due to this, (a+b+missing cases), (c+d+missing cases) and (e+f+missing cases) do not equal 100% in all cases.

General comments: More research should be done based on findings of the computer-student interaction (USA); There are enough articles, but often of low quality (RSA); More realistic research should be done (USA); More research on the methodology of Music Theory should be done in order to base the didactics of Aural Training on sound historical facts (FRG); I don't know any Aural Training periodical (FRG).

Question Twenty-one

Do you use a computer in your Aural Training tuition?
(a) Yes
(b) No

Table 25 Response frequencies for Question Twenty-one

	RSA	FRG	USA	ALL
(a)	**4 (57.1%)**	7 (10.1%)	**39 (73.6%)**	50 (38.8%)
(b)	3 (42.9%)	**62 (89.8%)**	14 (26.4%)	**79 (61.2%)**
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 7	N = 69	N = 53	N = 129

General comments: The student may decide to use supplemental computer instruction in our laboratory (USA); Yes, but need more (USA); Yes, supplemental work (USA); No, but facilities are available for self-help (USA); Computers are available to students who need extra work but are not used much in Aural Training - mainly in theory drills for chord recognition, etc. (USA); Yes, in our undergraduate programme only as a supplement to classroom work and tapes (RSA).

Questions Twenty-two and Twenty-three

The results of Questions Twenty-two and Twenty-three were combined because both questions sought reasons why lecturers were neglecting the use of the computer. The (b) part of Question Twenty-two *(I have subject-related didactical objections)* was expanded by combining it with Question Twenty-three *(If you have indicated answer 22b, which of the following apply?)* The combined Question is as follows:

Why do you not use a computer in your Aural Training?

(a) *I do not know enough about existing Aural Training programmes (software).*
(b) *I find the synthesized sounds unnatural and not aesthetic.*
(c) *Single elements such as intervals and chords are practised outside of a musical context.*
(d) *Computer programmes are too limited.*
(e) *The technical environment, e.g. the right cable connections, combinations of switches, etc., causes inconvenience.*
(f) *Programmes are not user-friendly.*
(g) *The financial commitment is too big.*
(h) *Other* ....

Table 26 Response frequencies for Questions Twenty-two and Twenty-three

	RSA	FRG	USA	ALL
(a)	1 (33.3%)	21 (33.9%)	**5 (35.7%)**	**27 (34.2%)**
(b)	0 (0%)	**25 (40.3%)**	2 (14.3%)	**27 (34.2%)**
(c)	0 (0%)	12 (19.4%)	0 (0%)	12 (15.2%)
(d)	1 (33.3%)	13 (21%)	2 (14.3%)	16 (20.3%)
(e)	0 (0%)	18 (29%)	2 (14.3%)	20 (25.3%)
(f)	0 (0%)	1 (1.6%)	1 (7.1%)	2 (2.5%)
(g)	**3 (100%)**	12 (19.4%)	**5 (35.7%)**	20 (25.3%)
(h)i[1]	0 (0%)	12 (19.4%)	1 (7.1%)	13 (16.5%)
(h)ii[2]	0 (0%)	4 (6.5%)	4 (28.6%)	8 (10.1%)
(h)iii[3]	1 (33.3%)	4 (6.5%)	1 (7.1%)	6 (7.6%)
(h)iv[4]	0 (0%)	4 (6.5%)	1 (7.1%)	5 (6.3%)
(h)v[5]	0 (0%)	4 (6.5%)	1 (7.1%)	5 (6.3%)
(h)vi[6]	2 (66.7%)	**22 (35.5%)**	**8 (57.1%)**	**32 (40.5%)**
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 3	N = 62	N = 14	N = 79*

(* N = 3, 62, 14, 79: Percentages were calculated taking into account only the respondents who indicated Twenty-one (b). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 **There is no computer available at our music department for Aural Training purposes**
2 **We are in a transitional phase: it is planned for the future**
3 **Computer-assisted Aural training is unnecessary**
4 **Computers are inhuman:** At our school we want to maintain a mostly teacher-pupil humanistic approach. We don't want it automated (USA); Aural Training requires the same individual approach necessary for instrumental teaching and because of this CAT is not realizable (FRG); Why do we meet in groups if each group member is "connected" to a computer? (FRG); According to my knowledge the computer can by no means replace the teacher (RSA).
5 **Computer-assisted Aural Training is a suitable for homework purposes**

6 **Other reasons**: Lack of adequate rooms (space) (FRG and USA); Lack of time to thoroughly examine the possibilities of CAT; (FRG); I prefer "live" music (FRG); CAT can be helpful in preparatory instruction but it is not creative enough on a tertiary level (FRG); Weak students benefit more from classroom-based instruction with the use of the piano; (FRG); The use of the piano in classroom-based instruction enables a more flexible methodological approach in comparison to CAT (FRG); I love the sound of the piano and the feel of the keys under my fingers (FRG); The instruments at hand in classroom-based instruction are more comprehensive and lively if they can be used according to the actual teaching situation (FRG); I believe that Aural Training takes places in that the student has to react by means of producing sound. If the computer cannot interpret this sound and evaluate it, it does not have the possibility to meet the student's basic needs (RSA); The imitation of timbre is insufficient. Sine waves are not equal to "natural tone imitation". "Natural" = the sum of sine waves. The ear was not designed for sine wave "sound happenings" (Schallereignisse) (FRG); Pitch is misleading - prefer acoustic sounds (USA); I don't think a programme of sufficient sophistication and authentic sound exists (USA); Group education with CAT seems to be problematic (FRG and USA); Related to the contractual obligations and contractual arrangement of my job (USA); A computer programme is limited by the knowledge/philosophy of the programmer. Therefore it is important to examine the didactics of Music Theory in order to prevent misleading students into listening falsely according to so-called historical rules that are not valid. (FRG); The few advantages of CAT do not weigh up to the financial burden and organisation attached to it (RSA).

General comments: We don't have the facilities (computers). I would use them if we had them, and if it was a structured part of our ear training curriculum (USA); I did not know about CAT until this Questionnaire reached me (FRG).

Which of the following features of computer programmes will meet your expectations for Aural Training? Indicate also features that seem to be utopian.

(a) Programmes to check sight singing with regard to interval, intonation and rhythmic mistakes.

(b) Programmes where the teacher can include his/her own examples and examples from the music repertoire.

(c) Perfectly sampled sounds. (Sounds that are used in computer programmes/synthesizers/samplers that resemble traditional music instruments perfectly.)

(d) Programmes in which short excerpts of works are played. Questions are asked about the character, style, type, form, harmonic content, etc.

(e) The possibility to manipulate music on records/CDs etc. for Aural Training purposes with the help of a computer. (Hyper-Media)

(f) The possibility to project a score on the monitor with the help of a computer reading apparatus, in order to select and sound one voice, instrumental group, e.g. the first violins, etc.

(g) Programmes with examples from the music repertoire (score appears on the monitor) in which any chosen sounding or written voice(s) can be left out. This provides the possibility to do sight singing and improvisation within a musical context.

(h) Other possibilities/utopia:...

Table 27 Summary of the results of Question Twenty-four/Thirty-nine

	RSA No CAT	CAT	Both	FRG No CAT	CAT	Both	USA No CAT	CAT	Both	ALL No CAT	CAT	Both*
(a)	**3 (100%)**	**4 (100%)**	**7 (100%)**	21 (33.9%)	2 (28.6%)	23 (33.3%)	**13 (92.9%)**	**31 (79.5%)**	**44 (83.0%)**	37 (46.8%)	37 (74%)	74 (57.4%)
(b)	3 (100%)	1 (25%)	4 (57.1%)	27 (46.8%)	**6 (85.7%)**	33 (47.8%)	10 (71.4%)	**31 (79.5%)**	41 (77.4%)	**50 (63.3%)**	**38 (76%)**	**78 (60.5%)**
(c)	3 (100%)	2 (50%)	5 (71.4%)	21 (33.9%)	3 (42.9%)	24 (34.8%)	7 (50%)	18 (70.2%)	25 (47.2%)	31 (39.2%)	23 (46%)	54 (41.9%)
(d)	2 (66.7%)	3 (75%)	5 (71.4%)	26 (41.9%)	4 (57.1%)	30 (43.5%)	5 (35.7%)	25 (64.1%)	30 (56.6%)	33 (41.8%)	32 (64%)	65 (50.4%)
(e)	2 (66.7%)	2 (50%)	4 (57.1%)	23 (37.1%)	4 (57.1%)	27 (39.1%)	5 (35.7%)	29 (74.4%)	34 (64.2%)	30 (38%)	25 (50%)	65 (50.4%)
(f)	1 (33.3%)	3 (75%)	4 (57.1%)	**35 (56.5%)**	4 (57.1%)	**39 (56.5%)**	7 (50%)	24 (61.5%)	31 (58.8%)	43 (54.4%)	31 (62%)	74 (57.4%)
(g)	2 (66.7%)	3 (75%)	5 (71.4%)	**35 (56.5%)**	4 (57.1%)	**39 (56.5%)**	5 (35.7%)	25 (64.1%)	30 (56.6%)	42 (53.2%)	32 (64%)	74 (57.4%)
(h)i[1]	0 (0%)	0 (0%)	0 (0%)	5 (7.9%)	0 (0%)	5 (7.2%)	0 (0%)	0 (0%)	0 (0%)	5 (6.3%)	0 (0%)	5 (3.9%)
(h)ii[2]	0 (0%)	1 (25%)	1 (14.3%)	1 (1.6%)	0 (0%)	1 (1.4%)	0 (0%)	1 (2.6%)	1 (1.9%)	1 (1.3%)	2 (4%)	3 (2.3%)
(h)iii[3]	0 (0%)	0 (0%)	0 (0%)	3 (4.8%)	0 (0%)	3 (4.3%)	0 (0%)	0 (0%)	0 (0%)	3 (3.8%)	0 (0%)	3 (2.3%)
(h)iv[4]	0 (0%)	0 (0%)	0 (0%)	1 (1.6%)	1 (14.3%)	2 (2.9%)	0 (0%)	0 (0%)	0 (0%)	1 (1.3%)	1 (2%)	2 (1.6%)
(h)v[5]	0 (0%)	1 (25%)	1 (14.3%)	2 (3.2%)	3 (42.9%)	5 (7.2%)	1 (7.1%)	4 (10.3%)	5 (9.4%)	3 (3.8%)	8 (16%)	11 (8.5%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	12 (19.4%)	0 (0%)	12 (17.4%)	1 (7.1%)	1 (2.6%)	2 (3.8%)	13 (16.5%)	1 (2%)	14 (10.9%)
	N = 3	N = 4	N = 7	N = 62	N = 7	N = 69	N = 14	N = 39	N = 53	N = 79	N = 50	N = 129

* No CAT, CAT, Both: In the first category percentages were calculated taking into account only the respondents who indicated that they did not make use of computer-assisted instruction in Question Twenty-one (b). In the second category percentages were calculated taking into account only the respondents who indicated that they did make use of computer-assisted instruction in Question Twenty-one (a). Both groups were combined in the third category. The cumulative frequencies exceed the value of 100% because of multiple indications.

1 I am not at all interested in computer-assisted Aural Training
2 Study plan for students: diagnose problem areas and recommend the next step of practice/learning
3 Error detection using examples from the music literature
4 Intonation software
5 Other possibilities

Responses to Questions 24(h)/39(h)

I am not at all interested in CAT: I cannot think of any desirable computer programmes; (People who left this question unanswered were also categorized under this heading.)

Study plan for students in which problem areas are diagnosed and the next step of practice/learning is recommended: Evaluation of mistakes and prescription for further study; the computer (programme) should not only indicate that an answer was wrong, but also what was wrong, and supply exercises to practise this specific deficiency.

Error detection using examples from the music literature: Computer programmes that prepare students for their career, e.g. as singers, orchestra players or conductors, would meet my expectations. Unfortunately no such programmes are available. An example of my expectations is: While following the score and listening to the piece being performed, the student should indicate which orchestra player made rhythmic mistakes, played wrong notes, or had intonation problems.

Intonation software: Programmes in which intonation problems in both natural and equal-tempered tuning systems are treated; Out of tune intervals should be corrected.

Other possibilities: Improved computer programmes. Some devoted to correct chord progressions in tonal music; Drill! (USA); Programmes which test the "building blocks" such as triads, chords and resolutions, scales, modes etc. so that more time can be spent on more musical aspects (USA); Software for NeXt computers (USA); Beyond my expectations but sounds great! (USA); Programmes enabling students to explore musical contexts by modifying given examples, re-scoring for different timbres, renovating, etc. Multi-media computer environments (USA); Discovery learning (creating musical objects and assembling them to reproduce an excerpt) (USA); Generally, the more tutorial (instead of merely a countability) the better (USA); All of these things seem technically possible either now or soon. Whether they are pedagogically desirable is another question. I don't see much value in, for example, your (f) possibility, when I can give a student a score, play the requisite line on the piano, and then play the whole recorded example. Putting a computer into the process doesn't change the pedagogical situation there (USA); Most of these capabilities are now available to me (USA); None are utopian - we do them all (USA); The possibility for singers to do sight singing with orchestra accompaniment (FRG); My (not at all utopian goal) is to have programmes which allows for flexible input of answers combined with simple usage instructions (user-friendliness) (FRG); The existence of exercise libraries that can be expanded by the teacher (FRG); Programmes in which the timbre, rhythm, melody, harmony and form can be influenced (FRG); The translation of sound into music notation (FRG); The manipulation of the sound spectrum (sound analysis and synthesis) and the spatial disposition of sounds and parts of the musical score (FRG); The computer indicates errors in dictation (RSA); Possibilities for Graphic Audiovisuals - Animated screens - music is motion, therefore the visuals should move - including light-intensities and various forms of graphic scores - to be used to highlight one or other parameter/facet of the music (RSA); I would be open to any possibility of gaining aural skills (RSA and FRG);

Questions Twenty-five/Forty

Do you make use of other Aural Training "Programmes" (not computer bound)?

(a) *No*
(b) *Music examples on magnetic tape/cassette for dictation.*
(c) *Music examples on magnetic tape/cassette with questions and multiple choice answers.*
(d) *"Ghost texts": parts of a score is left out, and the student has to fill in the missing information according to the assignment and what he/she hears.*
(e) *Other:...*

Questions Twenty-six/Forty-one

Please give a short description of the "programme(s)" that you indicated in Questions 25/40 according to the content, method (manner) and purpose:

The results of Questions Twenty-five/Forty and Twenty-six/Forty-one were combined in one table.

Table 28 Response frequencies for Questions twenty five and Twenty-six/Forty and Forty-one)

	RSA	FRG	USA	ALL
(a)	2 (28.6%)	26 (37.7%)	23 (43.4%)	51 (39.5%)
	N = 7	N = 69	N = 53	N = 129
(b)	**4 (80%)**	**34 (79.1%)**	**24 (80%)**	**62 (79.5%)**
(c)	0 (0%)	1 (2.3%)	6 (20%)	7 (9%)
(d)	1 (20%)	15 (34.9%)	2 (6.7%)	18 (23%)
(e)i[1]	1 (20%)	7 (16.3%)	0 (0%)	8 (10.3%)
(e)ii[2]	3 (60%)	2 (4.7%)	7 (23.3%)	12 (15.4%)
(e)iii[3]	0 (0%)	3 (7%)	0 (0%)	3 (3.8%)
(e)iv[4]	1 (20%)	5 (11.6%)	0 (0%)	6 (7.7%)
(e)v[5]	2 (40%)	6 (14%)	4 (13.3%)	12 (15.4%)
(e)vi[6]	1 (20%)	6 (14%)	5 (16.7%)	12 (15.4%)
(e)vii[7]	0 (0%)	8 (18.6%)	4 (13.3%)	12 (15.4%)
(e)viii[8]	1 (20%)	7 (16.3%)	4 (13.3%)	12 (15.4%)
Missing cases:	0 (0%)	3 (7%)	2 (6.7%)	5 (6.4%)
	N = 5	N = 43	N = 30	N = 78*

(* N = 5, 43, 30, 78: Percentages were calculated taking into account only the respondents who indicated that they did make use of NCAT. The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 **Aural analysis**
2 **Commercially available programmed textbooks with cassettes:** TAP Master (USA), Horacek and Lefkoff (USA and RSA)[4], Leo Kraft (USA), A. Trubitt and R. Hines (USA), Kral and Zopf (FRG), Benward workbooks and cassettes (USA); Michael Schmoll (FRG), B. Fawcett Harrap (USA);
3 **Cassettes for "playing by ear" (Nachspielen)**
4 **Cassettes for recognition of timbre**
5 **For homework purposes**
6 **Cassettes with "building-block" exercises** (intervals, triads, etc.)
7 **Percentage of people who indicated that they use examples from the music literature**
8 **Other "programmes":** Cassettes with examples of the final examination in Aural Training (FRG); Cassettes with examples of the entrance test and placement tests (USA); Examples from the music literature with special aural assignments such as transcription (dictation), harmonical analysis, graphical presentation, description of form (FRG and USA); Text comparisons (FRG); Each student has to create a short score and has to rehearse that with the group in order to develop inner hearing, creativity, pedagogical skills and error detection (FRG); Students work on their own and hand in weekly assignments for assessment. No limit is placed on amount of work to be handed in and students can work at their own pace. A realistic minimum requirement is set as DP (Duly Performed). (RSA); Error detection (FRG and USA); For first-year college study: Brief, instructor-composed examples, recorded piano sound source. Covers basic (readiness) skills: High-Low points in melody, skips location in melody, similar/different melodies or rhythms, melodic and rhythmic error detection, identification of whole and half steps - short rhythms (location in phrase), melody memory (listen and sing back), multiple choice type of Questions on melody, discuss characteristics of a melody. For second-year college study: Two-voice counterpoint (composed by instructor and taken from the music literature) - as dictation; description of mode, meter, opening and closing gestures in melody; identification of melody structural pitches; Common practice period and 20th-century rhythm dictation; melodic error detection (pitch and rhythm); melodic dictation; harmonic dictation; tonic, dominant, subdominant function, bass line and chord analysis - including secondary dominants, Neapolitan and augmented sixth chords (USA).

4 One respondent complained that the pitches on the magnetic tapes were not always accurate and that especially the absolute pitch possessors had problems with this.

General comments: Self-developed exercises (ALL) such as "My Self Help Aural Recognition Program (SHARP) - each cassette with 100 examples of intervals or chords, with an accompanying book with which students may check their answers or give themselves practise quizzes" (USA); The contents of Question Twenty-five can be accomplished by using the piano and the voice (FRG); I also include Jazz and Pop Music examples (FRG); Too many to list briefly. (New individual approaches to teaching sight singing and dictation) (USA); Series of graded examples that progressively become more difficult (USA); All in all sixty individual programmes are organized according to the levels difficulty in learning units (FRG).

Question Twenty-seven/Forty-two

Would you be interested in a workshop concerning the use of the computer in Aural Training?
(a) Yes
(b) No

Table 29 Response frequencies for Question Twenty-seven/Forty-two

	RSA	FRG	USA	ALL
(a)	**6 (85.7%)**	**43 (62.3%)**	**34 (64.2%)**	**83 (64.3%)**
(b)	0 (0%)	20 (29%)	14 (26.4%)	34 (26.4%)
Missing cases:	1 (14.3%)	6 (8.7%)	5 (9.4%)	12 (9.3%)
	N = 7	N = 69	N = 53	N = 129

General comments: Contact the Association for Technology in Music Instruction (USA); Our university has two to three workshops a year (USA).

Question Twenty-eight/Forty-three

In your opinion, which aspects of Aural Training are not included in this questionnaire that need attention?

Table 30 Response frequencies for Question Twenty-eight/Forty-three

	RSA	FRG	USA	ALL
(a)1	**2 (28.6%)**	2 (2.9%)	**3 (5.7%)**	7 (5.4%)
(b)2	1 (14.3%)	2 (2.9%)	2 (3.8%)	5 (3.9%)
(c)3	0 (0%)	**7 (10.1%)**	2 (3.8%)	**9 (7%)**
(d)4	**2 (28.6%)**	1 (1.4%)	0 (0%)	3 (2.3%)
(e)5	4 (57.1%)	26 (37.7%)	12 (22.6%)	42 (32.6%)
Missing cases:	1 (14.3%)	39 (56.5%)	36 (67.9%)	76 (58.9%)
	N = 7	N = 69	N = 53	N = 129

(The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 **Music psychological aspects of Aural Training**: Correlation of music education and music theory research on perception (USA); Sequence of material of learning (Gordon, etc.) (USA); Medical-psycho-acoustical research (FRG); Psychology of the learner; affect of fatigue, anxiety, confidence, acoustics, extraneous noises. Viability of tests, given the stress situation, i.e. problem of evaluation (USA); Cognitive perspective - how do we actually perceive and store sound - surely in some kind of cognitive context (USA); Audio-physiology: Tomatis has a lot to say about people e.g. who can sing, but can't hear; who can hear certain pitches; who can hear and can't sing etc. Ear Cleaning (RSA); Memory (FRG); Stress factors such as fear, concentration problems (FRG);

2 **More/other aspects of computer-assisted Aural Training**: Lay people's fear of computers (USA); The musicality of computer-generated assignments (FRG); Music and movement: Computers cannot teach the body to sense rhythm - you only asked one question on those lines (USA); Affective decline (FRG); The use of the computer in the classroom vs the use of the computer in a lab where students go to work individually on a volunteer basis (USA); The problem of applying CAT to group instruction (FRG);

3 **Objectives and Contents of Aural Training**: What skills (precisely) should be developed? When (how long and in what order) should each be taught? (USA); Possibly the (final) goals of the total programme (USA and FRG); Approaches to methodology and philosophy of education (USA); Contents (FRG);

4 **Cultural differences**: More Aural Training in Ethnic Music because the new Music Syllabus for the new S.A. will contain 60% Ethnic as against 40% Western music (RSA); National perspectives (RSA and FRG).

5 **Other aspects**: Research - transfer of skills e.g.: is dictation good for anything? (RSA); Connection of aural training skills to real music listening (RSA); Aspects of group instruction (FRG); Aural Training as major subject (FRG); Evaluation systems (FRG); Curriculum design (USA); Entrance requirements (FRG); Diagnosing aural problems and solving them (RSA); How to help the marginal student (RSA); A study of students who cannot match pitch, or who can only match pitches within a relatively narrow range of pitches (i.e. a perfect fifth) (USA); The transition of Aural Training into Aural Analysis (FRG); Different methods of Dictation (FRG); Individual innovations in teaching sight singing and dictation concepts and learning techniques (USA); Inner hearing (USA and FRG); Polyphonic awareness (USA); The independent work of students in Aural Training during their music studies such as meeting in small groups (FRG); Education of Aural Training lecturers (FRG); Students have great difficulty transferring shorter "sterile" examples (models) to musical contexts. Yet recitals and concerts deal with such contexts. Much more attention needs to be given to the development of aural skills applied to context (USA); Integrating Aural Training into instrumental music studies right from the beginning, integration vs. differentiation (RSA); Aural Training for the general listener (amateur) (RSA); Social training by means of music (FRG); The importance of listening to each other and reacting upon each other when performing with other people (FRG); Unfavourable teaching conditions such as lack of sound isolation in classrooms (FRG); Historical relativity of Aural Training (FRG); Aural Training based on not equal-tempered tuning systems and micro tonality (FRG); Acoustics, tuning systems, timbre identification/terminology (RSA); Is our only goal eye-ear correlation or is there room for oral traditions? (RSA); The question of musicality (FRG); The integration of a set of complex skills which develop out of natural musical behaviour (RSA); Achievement differences within a group of 10-12 students and the problems attached to it (FRG); The dependence (relationship) of music perception on the terminology and methodology of Music Theory (FRG); The separation of music disciplines such as Harmony and Counterpoint leads to stagnation and concentration on isolated aspects such as the root of a chord (FRG); Improvisation, keyboard harmony, discovery learning (RSA); The difference between drill (concentrating on isolated methods such as dictation) and education (inner structure of music, analytical listening) (FRG); Intonation problems (FRG and USA); Students' attitudes towards Aural Training (FRG); Aural Training should also incorporate knowledge of the human nature (FRG); Judging musical performance (USA); Sight singing methodologies (Jersild vs structural reductions, etc) (USA); The relationship of analysis to the teaching of aural skills (USA); The influence that various different types of hearers has on the methodology of Aural Training (FRG); Instructions to self-instruction (FRG); How to get variation in Aural Training (RSA).

Question Twenty-nine

Which computer programmes (software) do you use?

(a) Commercially available software: (Name(s) of programme(s) and address(es) of retailer(s):..............

(b) Self-programmed software

Table 31 Response frequencies for Question Twenty-nine

	RSA	FRG	USA	ALL
(a)i[1]	0 (0%)	**5 (71.4%)**	0 (0%)	5 (10%)
(a)ii[2]	0 (0%)	0 (0%)	6 (15.4%)	6 (12%)
(a)iii[3]	0 (0%)	0 (0%)	10 (25.6%)	10 (20%)
(a)iv[4]	1 (25%)	0 (0%)	11 (28.2%)	12 (24%)
(a)v[5]	**4 (100%)**	0 (0%)	5 (12.8%)	9 (18%)
(a)vi[6]	0 (0%)	0 (0%)	**14 (35.9%)**	14 (28%)
(a)vii[7]	0 (0%)	0 (0%)	6 (15.4%)	6 (12%)
(a)viii[8]	0 (0%)	4 (57.1%)	14 (35.9%)	18 (36%)
(b)	0 (0%)	2 (28.6%)	**18 (46.2%)**	**20 (40%)**
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Audimax
2 Benward
3 McGamut
4 Practica Musica
5 Guido
6 Temporal Acuity Products: e.g. Catch the key; Pick the pitch; Rhythm drills; WMU Dictation Series: Diatonic chords; Harmonic dictator; Theory sampler; Jazz Dictator; Rhythmic dictator; Interval Mania; Harmony drills, Set I; Melodious Dictator.
7 Products from Educational Courseware
8 Other commercially available software: Perceive; Micro^Notes Music Theory; Explorations; Aura; Computerkolleg; CAMUS; C-Lab Notator (sequencer programme[5]); Professional Performer (sequencer programme); Mini Trax (public domain software) also several CD-ROM programs; We have an extensive library of programs for Macintosh and Apple II computer; Use sequencer a lot with aural interaction.

Question Thirty

With regard to commercially available software: why did you choose this (these) specific program(s)?

The answers to this question varied so much that a statistical interpretation was impossible. Responses included words and phrases such as: Usable (FRG), *Guido* was the only available programme at the time (USA); The *Dictator* series was almost the only available Apple software for several years (USA); It is only one of a few German programmes written for the Atari (FRG); It is only one of a few programmes written for the Macintosh (USA); Macintosh products are both versatile and user-friendly, unlike those for Apple II, IBM etc. (RSA); The best amongst those available (FRG and USA); It was available at our school (USA); Lack of availability of good quality material at the time purchased (USA); There are not many to choose from (USA); Completeness, flexibility, content, quality, interaction with student, scoring features (USA); They were chosen by others before I arrived (USA); Broad spectrum of training (FRG and USA); Efficient (USA); Because the programme was developed at our university (FRG); Familiarity (USA); Because of costs involved (FRG); Graduated order of difficulty (USA); Least worst (USA); Provides for the needs (USA).

5 "Sequencers are to the digital music world what tape decks are to the analog music world. Like tape decks, sequencers record and store music data, allowing the musician to edit that music, record multiple tracks, listen to and play that same music, and modify it to his or her particular liking." H.P. Newquist, **Music & Technology**. New York: Billboard Books, 1989 p. 129.

Question Thirty-one

If you have indicated "self-programmed software" in Question 29, why did you design such a program?
(a) Software programming is an interesting field and I wanted to try it out myself.
(b) I am not satisfied with the commercially available software.
(c) My programme(s) has (have) other features than the commercially available software. Which features?
(d) Other:..

Table 32 Response frequencies for Question Thirty-one

	RSA	FRG	USA	ALL
(a)	0 (0%)	**2 (100%)**	4 (22.2%)	6 (30%)
(b)	0 (0%)	**2 (100%)**	**9 (50%)**	**11 (55%)**
(c)[1]	0 (0%)	1 (50%)	8 (44.4%)	9 (45%)
(d)[2]	0 (0%)	0 (0%)	2 (11.1%)	2 (10%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 0	N = 2	N = 18	N = 20*

(* N = 0, 2, 18, 20: Percentages were calculated taking into account only the respondents who indicated Twenty-nine (b). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 High-level graphical interface, strong "infinitive" feel, ability to use any CD (USA); Clef training; sight reading (ability to read ahead, graded dictation) (USA); Uses real music examples, not random. Also, a version using CD-ROM will become available. It plays commercial CDs (USA); Direct microphone input to pitch extractor card which converts input to notation and scoring/progress records (USA); Real-time harmonization, improvisation, playing by ear (USA); Harmonic Dictation Exercises in which different voices (SATB) are emphasized with each playing (USA); Concentration on melodies from literature; harmonic patterns for Wittlich and Martin text (USA); Inclusion of modulations (FRG).

2 Enables us to have a more expansive series. Benward did not have enough examples in some areas for those students who require more time as well as variables (USA); Software design was less expensive and had more possibilities for the students (USA).

Question Thirty-two

Would you be willing to make available your self-programmed software for research purposes? Naturally the copyright will be protected and the program will not be copied or circulated without your permission. In case you agree, please supply me with your address.
(a) Yes
(b) No

Table 33 Response frequencies for Question Thirty-two

	RSA	FRG	USA	ALL
(a)	0 (0%)	**2 (100%)**	7 (38.9%)	9 (45%)
(b)	0 (0%)	0 (0%)	**11 (61.1)**	**11 (55%)**
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 0	N = 2	N = 18	N = 20*

(* N = 0, 2, 18, 20: Percentages were calculated taking into account only the respondents who indicated Twenty-nine (b).)

Three of the persons who were willing to make available their software distribute their programs commercially. Some persons indicated that they were not willing to make their software available because it is sold commercially. Letters were written to the nine respondents. One respondent answered that his software had nothing to do with Aural Training. Only one respondent actually sent a copy of his software.

Question Thirty-three

Which computer do you use?
(a) IBM/IBM compatible
(b) Apple Macintosh
(c) Atari
(d) Other..

Table 34 Response frequencies for Question Thirty-three

	RSA	FRG	USA	ALL
(a)	**3 (75%)**	1 (14.3%)	13 (33.3%)	17 (34%)
(b)	1 (25%)	0 (0%)	**25 (64.1%)**	**26 (52%)**
(c)	0 (0%)	**7 (100%)**	2 (5.1%)	9 (18%)
(d)i[1]	0 (0%)	0 (0%)	20 (51.3%)	20 (40%)
(d)ii[2]	2 (50%)	0 (0%)	3 (7.7%)	5 (10%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a). The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Apple (II, II+, IIc, IIe, IIgs)
2 Other computers (Control Data, NeXt and Sun platforms)

Question Thirty-four

Which synthesizer/keyboard/sampler (if any) do you use with your computer? Please give the full name, e.g. Roland D70:

Table 35 Response frequencies for Question Thirty-four

	RSA	FRG	USA	ALL
(a)[1]	0 (0%)	0 (0%)	11 (28.2%)	11 (22%)
(b)[2]	**3 (74%)**	0 (0%)	3 (7.7%)	6 (12%)
(c)[3]	1 (25%)	**5 (71.4%)**	**24 (61.5%)**	**30 (60%)**
(d)[4]	0 (0%)	2 (28.6%)	4 (10.3%)	6 (12%)
(e)[5]	0 (0%)	3 (42.9%)	4 (10.3%)	7 (14%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a). The cumulative frequencies exceed the value of 100% in some cases because of multiple indications.).

1 **No extra hardware equipment used**
2 **Sound Cards:** The University of Delaware Sound Card; IBM Music Feature Sound Card

3 **Synthesizers and/or Sample players:** Yamaha DX7; Yamaha YPR 9; Yamaha PF 2000; Yamaha TG77; Yamaha SY55; Yamaha DS55, DX21, DX27; Roland SY22; Roland D70; Roland S550; Roland D50; Roland V220, Roland U110; Roland W30; Roland D110; Korg M1; Numerous models ranging from Casio CZ1; Prophet 2000; Yamaha CLP 350; Casio MT240; Ensoniq ESQ80; Kawai K I II; Kawai PH50; Kawai FS680; Kawai K-4; Casio CZ100; Kurzweil K1200; Kurzweil K1000 Special Edition

4 **Sampler:** AKAI S-900; Ensoniq EPS; Kurzweil 250

5 **Yamaha Clavinova**

Other hardware equipment indicated: MIDI-Merger PMM-44, self-developed tap-board (FRG); Korg DDD1 (drum machine) (USA).

Question Thirty-five

Which of the following applies to your teaching situation?

(a) The computer is used only as a practice instrument, for homework purposes, outside of the Aural Training Class.

(b) The computer is used only as part of my teaching.

(c) The computer is used as part for teaching and as a practice instrument.

Table 36 Response frequencies for Question Thirty-five

	RSA	FRG	USA	ALL
(a)	**3 (75%)**	**5 (71.4%)**	**26 (66.6%)**	**34 (68%)**
(b)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
(c)	1 (25%)	1 (14.3%)	13 (33.3%)	15 (30%)
Missing cases:	0 (0%)	1 (14.3%)	0 (0%)	1 (2%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a).)

Question Thirty-six

Which students make use of the computer?

(a) only under-performing students

(b) only "good" students

(c) all students

Table 37 Response frequencies for Question Thirty-six

	RSA	FRG	USA	ALL
(a)	1 (25%)	**3 (42.9%)**	3 (7.7%)	7 (14%)
(b)	0 (0%)	1 (14.3%)	0 (0%)	1 (2%)
(c)	**3 (75%)**	1 (14.3%)	**36 (92.3%)**	**40 (80%)**
Missing cases:	0 (0%)	2 (28.6%)	0 (0%)	2 (4%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a).)

General comments: Freshmen - some use by upper "classmen" (USA); We give students a small incentive (60 of 1000 total grade points in a term) to use the computers or the pre-recorded tapes for practice. Perhaps 35% - 40% of the students do so regularly, both good and bad students (USA); All students, but especially under-performing students (RSA).

Question Thirty-seven

Have the Aural Training achievements of your students improved noticeably since you have started to use the computer?
(a) Yes
(b) No
(c) I have not been using the computer very long, so the results are not noticeable yet.

Table 38 Response frequencies for Question Thirty-seven

	RSA	FRG	USA	ALL
(a)	**3 (75%)**	1 (14.3%)	**17 (43.6%)**	**21 (42%)**
(b)	0 (0%)	0 (0%)	8 (20.5%)	8 (16%)
(c)	1 (25%)	**6 (85.7%)**	14 (35.9%)	**21 (42%)**
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 4	N = 7	N = 39	N = 50*

(* N = 4, 7, 39, 50: Percentages were calculated taking into account only the respondents who indicated Twenty-one (a).)

General comments: I am really not as satisfied as I originally thought I would be (USA); Yes, more or less moderate students (RSA); I have noticed a number of improving students, and others have said that such work has helped them. I think any such practice opportunity will help students (USA); At the moment we are examining this aspect - the results will be available in April 1991 (FRG).

Question Thirty-eight

If you have answered Yes in Question 37, which of the following have improved?
(a) Rhythmic skills
(b) Interval awareness
(c) Harmonic-functional hearing
(d) Timbre perception
(e) Dictation
(f) Sight Singing
(g) Aural analysis
(h) Score reading
(i) Style recognition
(j) Comprehension of musical structures
(k) Intonation
(l) Memory
(m) Other..

Table 39 Response frequencies for Question Thirty-eight

	RSA	FRG	USA	ALL
(a)	2 (66.7%)	0 (0%)	7 (41.2%)	9 (42.9%)
(b)	**3 (100%)**	**1 (100%)**	**14 (82.4%)**	**18 (85.7%)**
(c)	2 (50%)	0 (0%)	13 (76.5%)	15 (71.4%)
(d)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
(e)	**3 (100%)**	**1 (100%)**	**14 (82.4%)**	**18 (85.7%)**
(f)	0 (0%)	0 (0%)	2 (11.8%)	2 (9.5%)
(g)	1 (33.3%)	0 (0%)	3 (17.6%)	4 (19%)
(h)	0 (0%)	0 (0%)	1 (5.9%)	1 (4.8%)
(i)	0 (0%)	0 (0%)	1 (5.9%)	1 (4.8%)
(j)	1 (33.3%)	0 (0%)	3 (17.6%)	4 (19%)
(k)	0 (0%)	0 (0%)	3 (17.6%)	3 (14.3%)
(l)	2 (66.7%)	0 (0%)	7 (41.2%)	9 (42.9%)
(m)1	0 (0%)	**1 (100%)**	1 (5.9%)	2 (9.5%)
Missing cases:	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	N = 3	N = 1	N = 17	N = 21*

(* N = 3, 1, 17, 21: Percentages were calculated taking into account only the respondents who indicated Thirty-seven (a).) The cumulative frequencies exceed the value of 100% because of multiple indications.)

1 Chord recognition (FRG and USA)

Fig. 1 Aural Training methods in the RSA

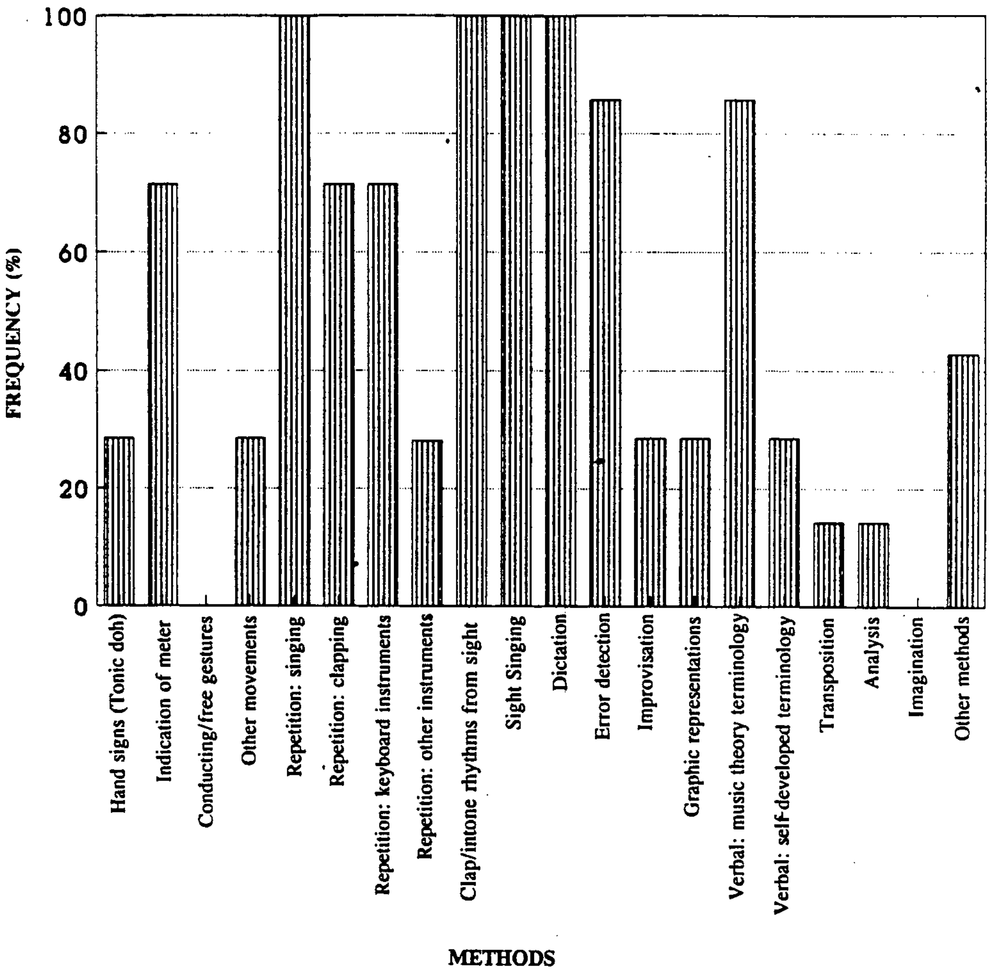


Fig. 2 Number of methods per RSA lecturer

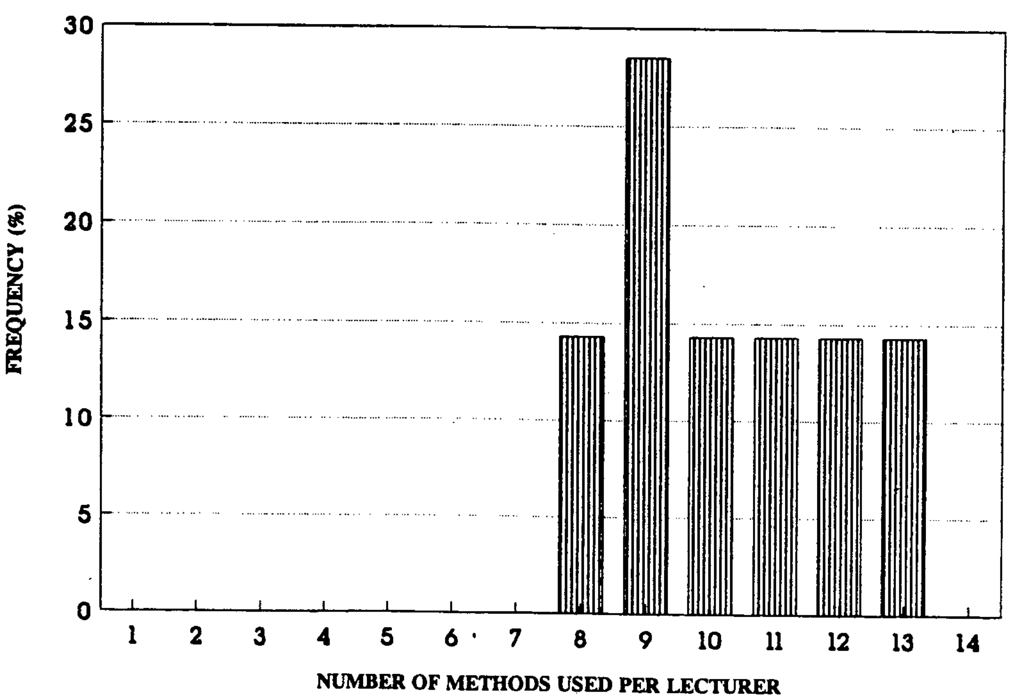


Fig. 3 Aural Training methods in the FRG

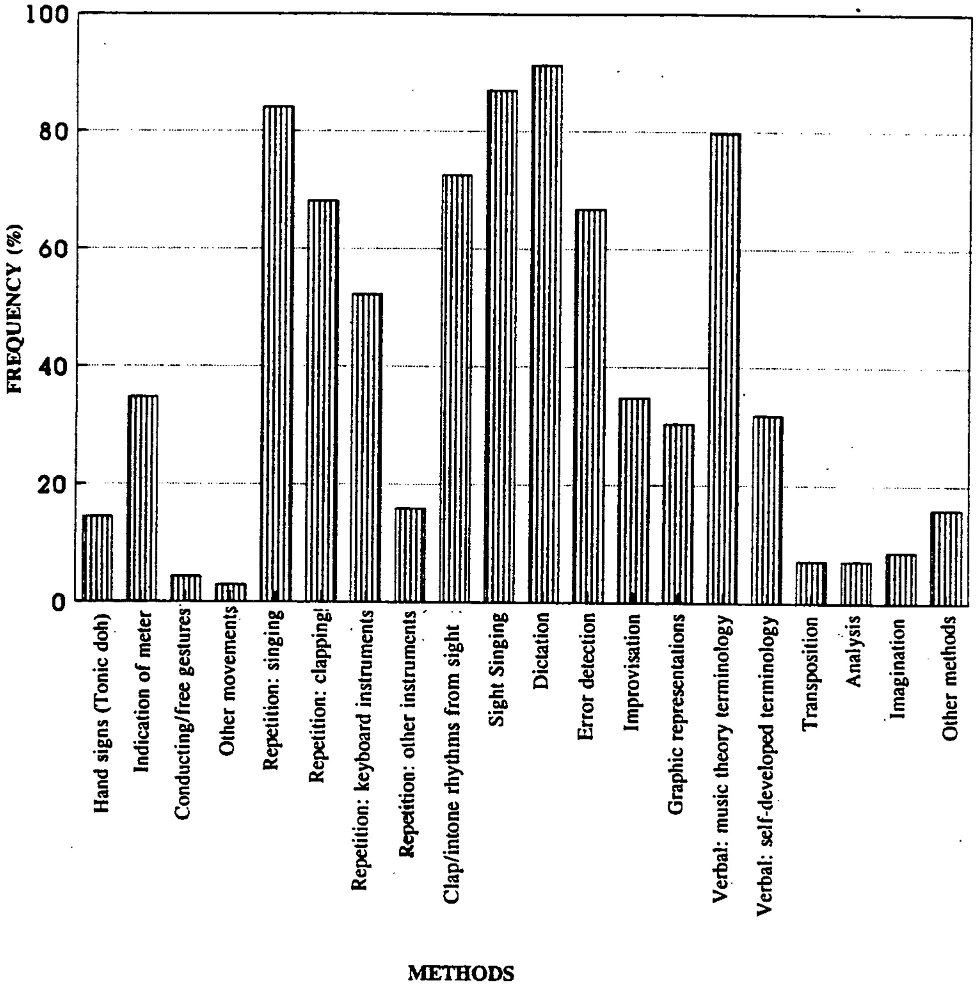


Fig. 4 Number of methods per FRG lecturer

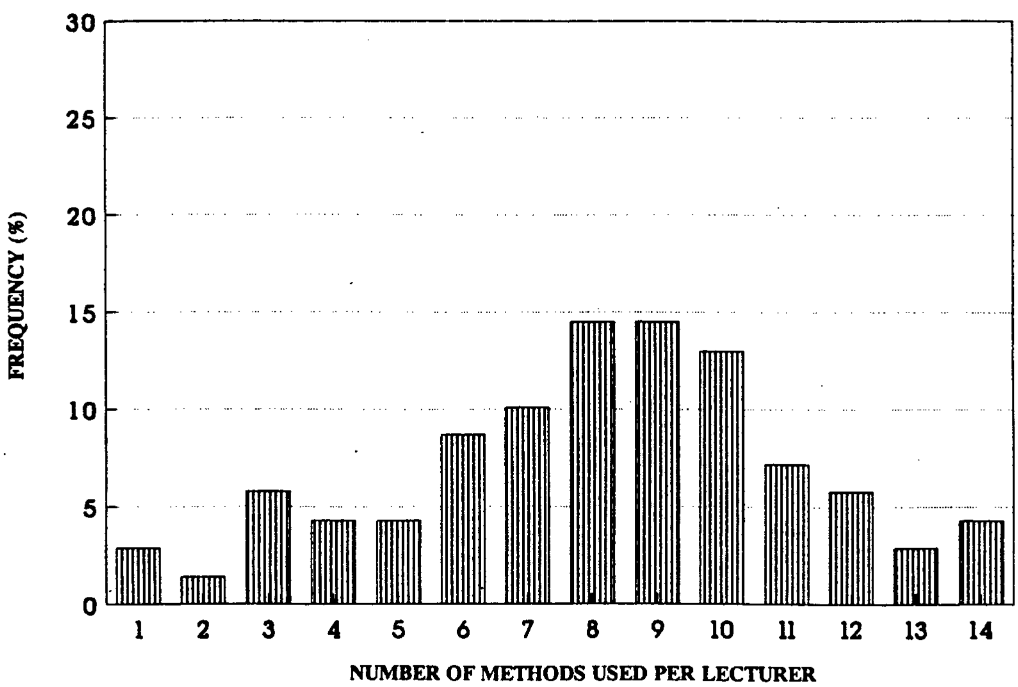


Fig. 5 Aural Training methods in the USA

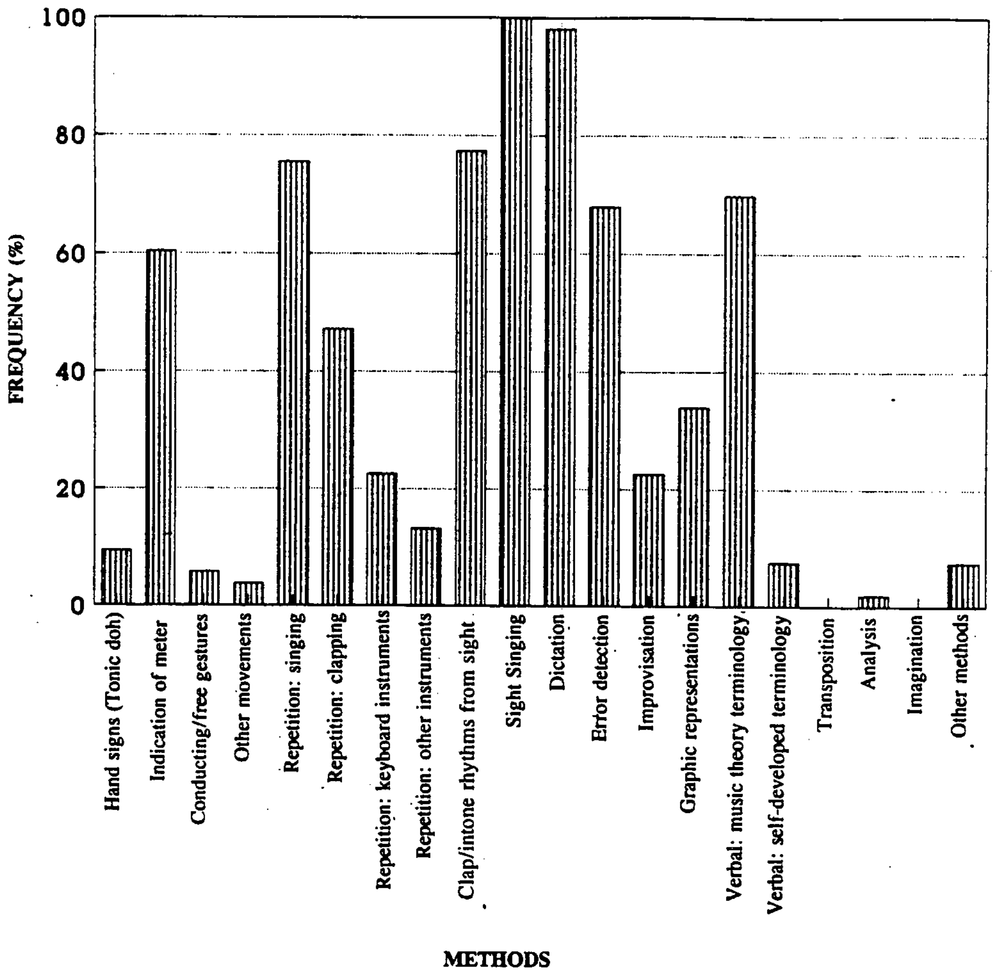


Fig. 6 Number of methods per USA lecturer

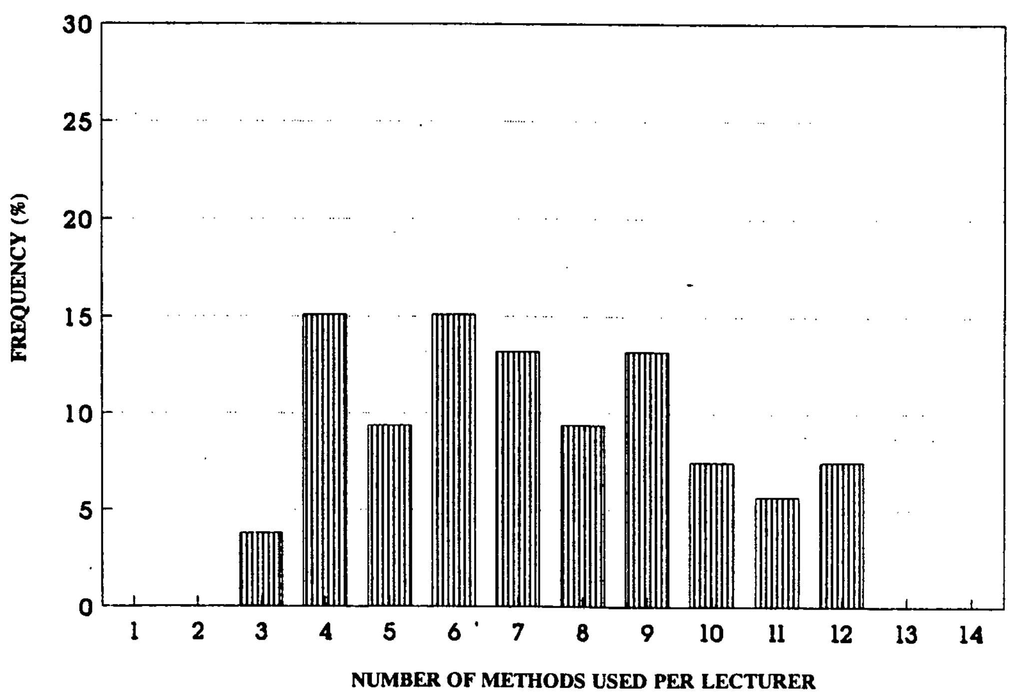


Fig. 7 Aural Training methods in ALL three countries

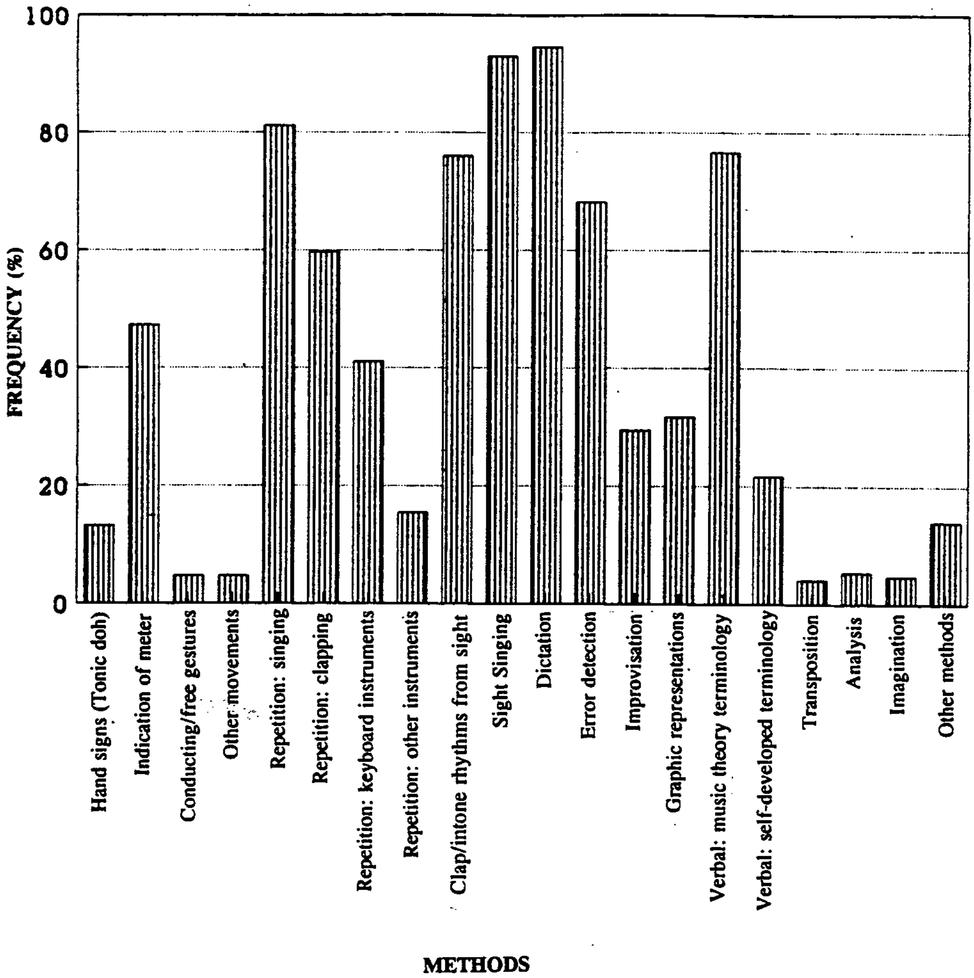


Fig. 8 Number of methods per lecturer in ALL three countries

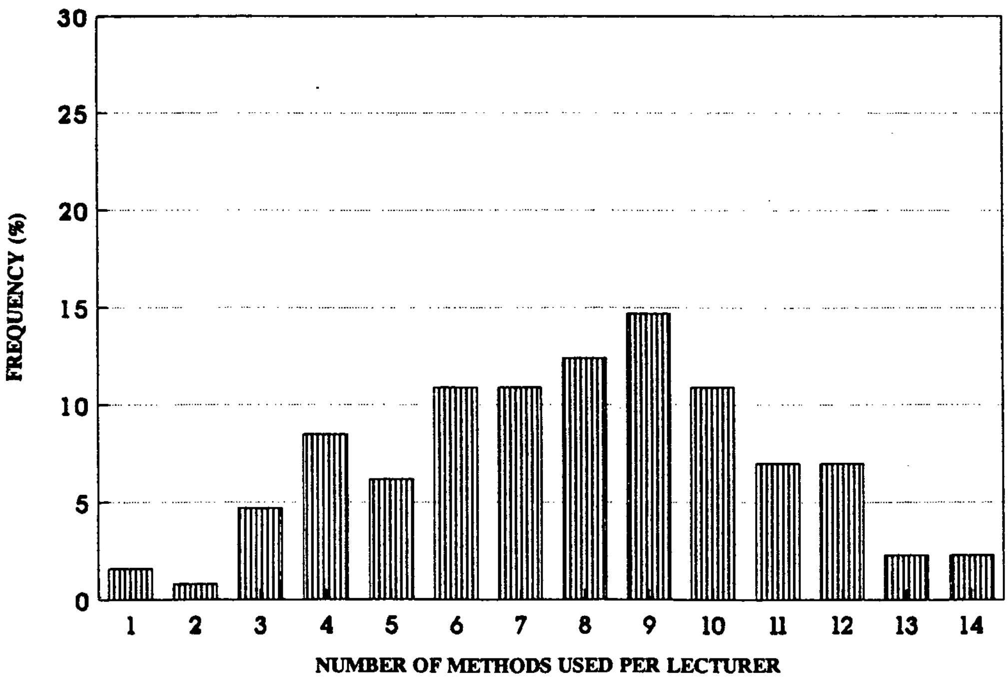


Fig. 9 Sight Singing methods in the RSA

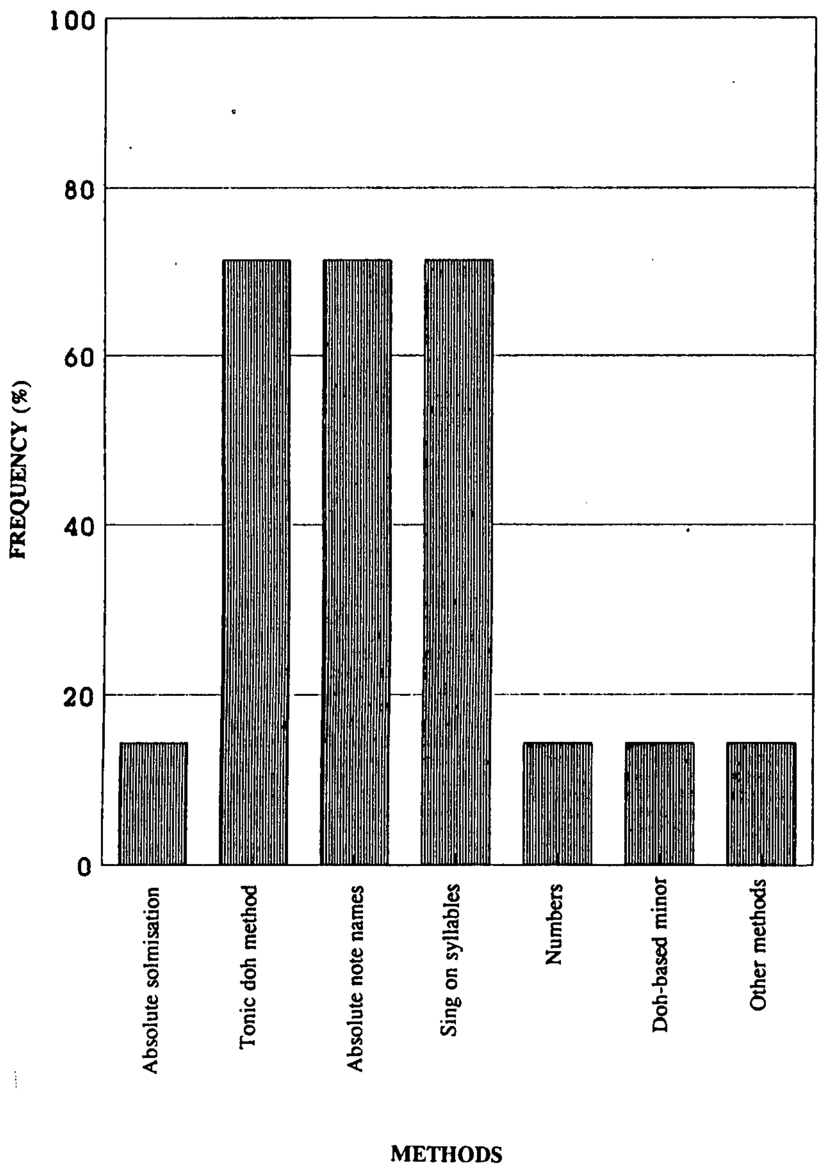


Fig. 10 Number of Sight Singing methods per RSA lecturer

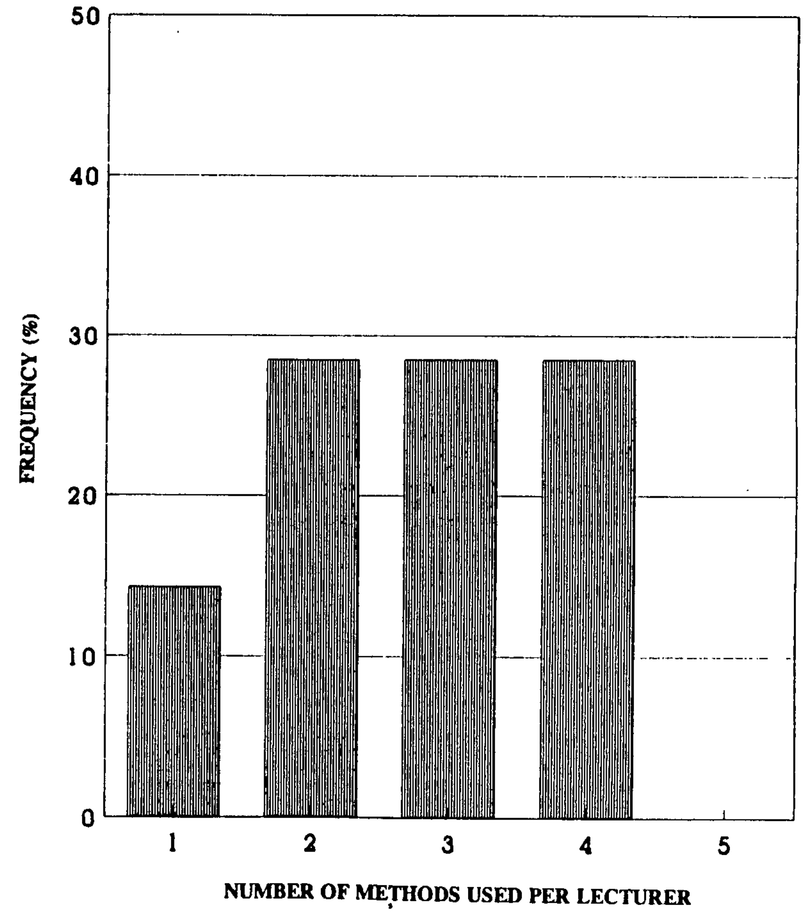


Fig. 11 Sight Singing methods in the FRG

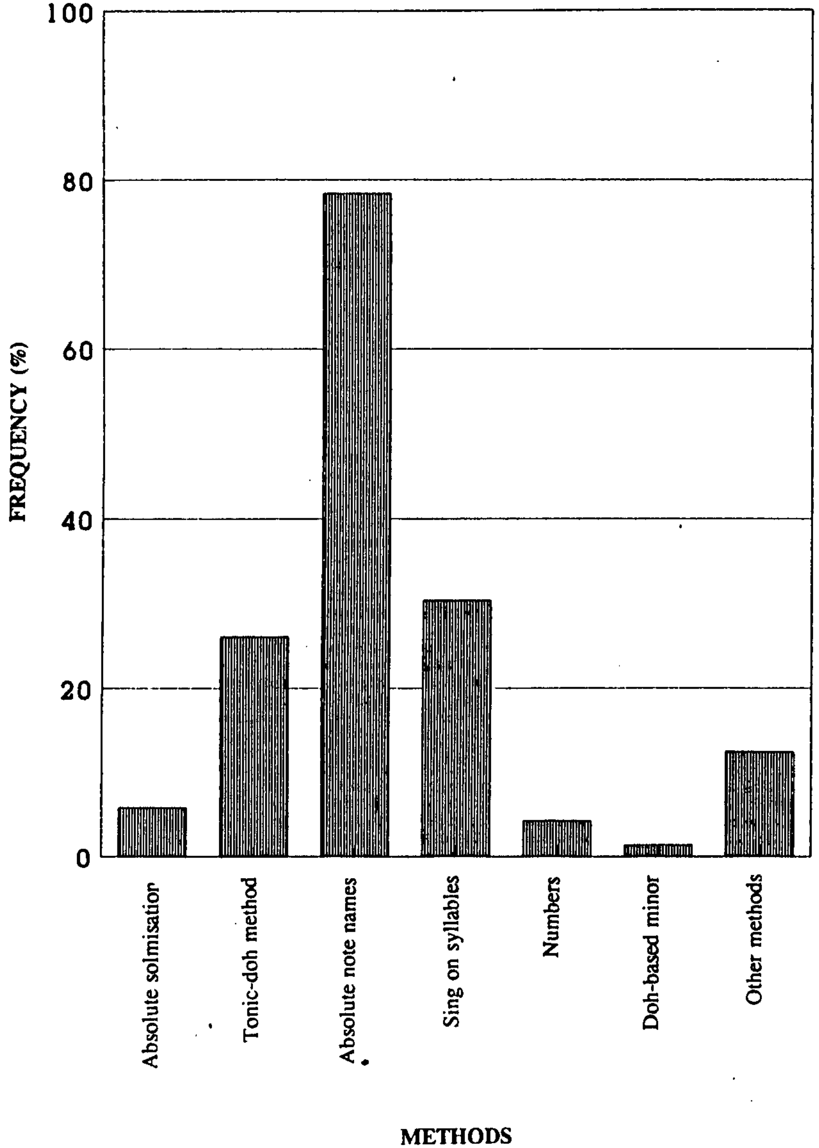


Fig. 12 Number of Sight Singing methods per FRG lecturer

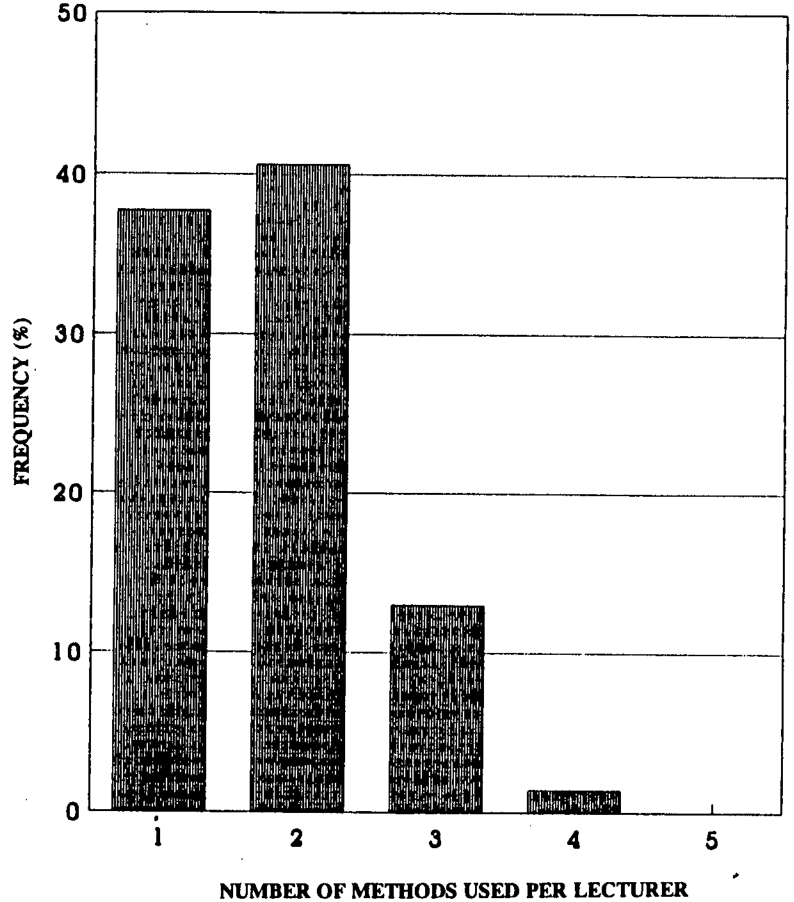


Fig. 13 Sight Singing methods in the USA

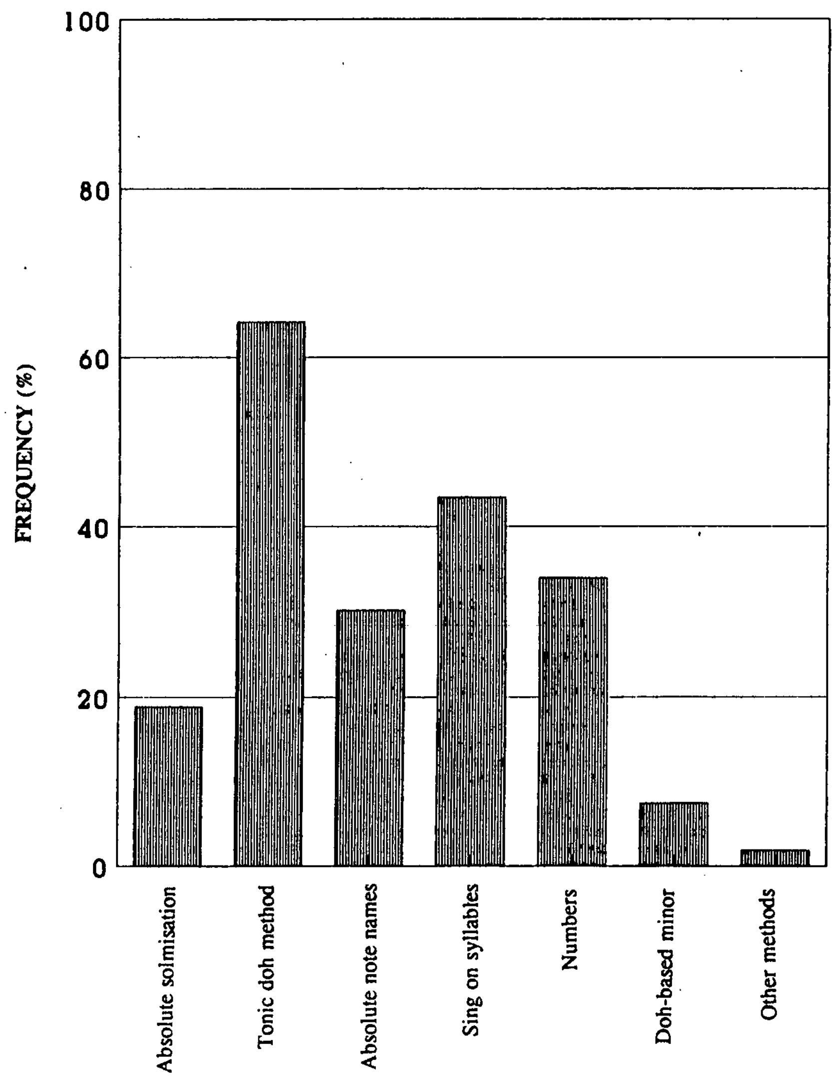


Fig. 14 Number of Sight Singing methods per USA lecturer

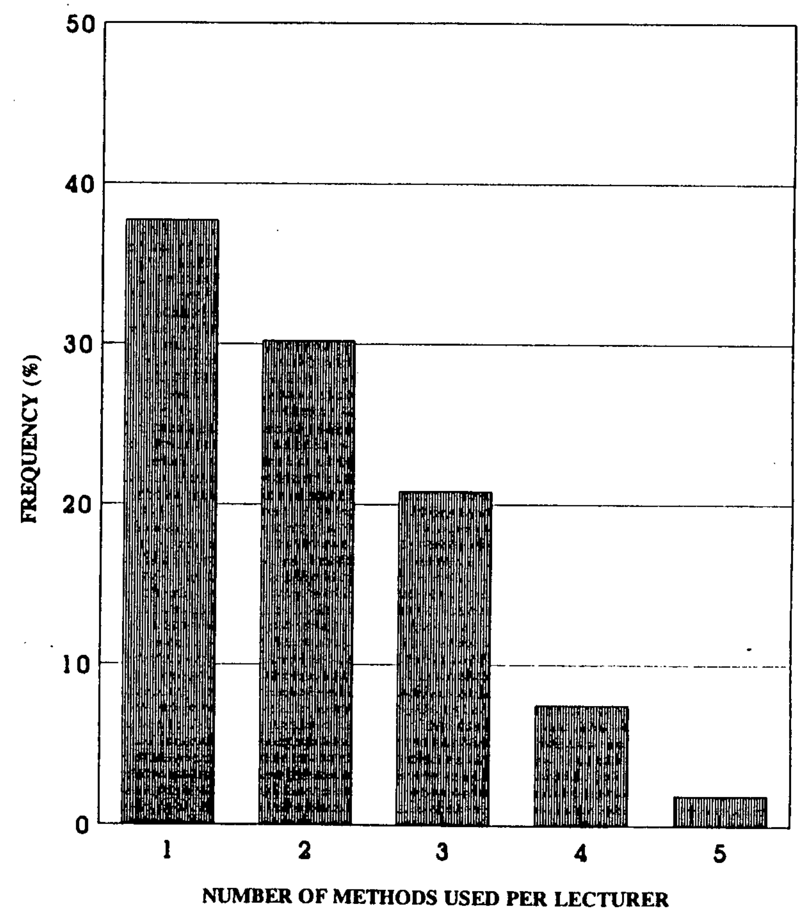


Fig. 15 Sight Singing methods in ALL three countries

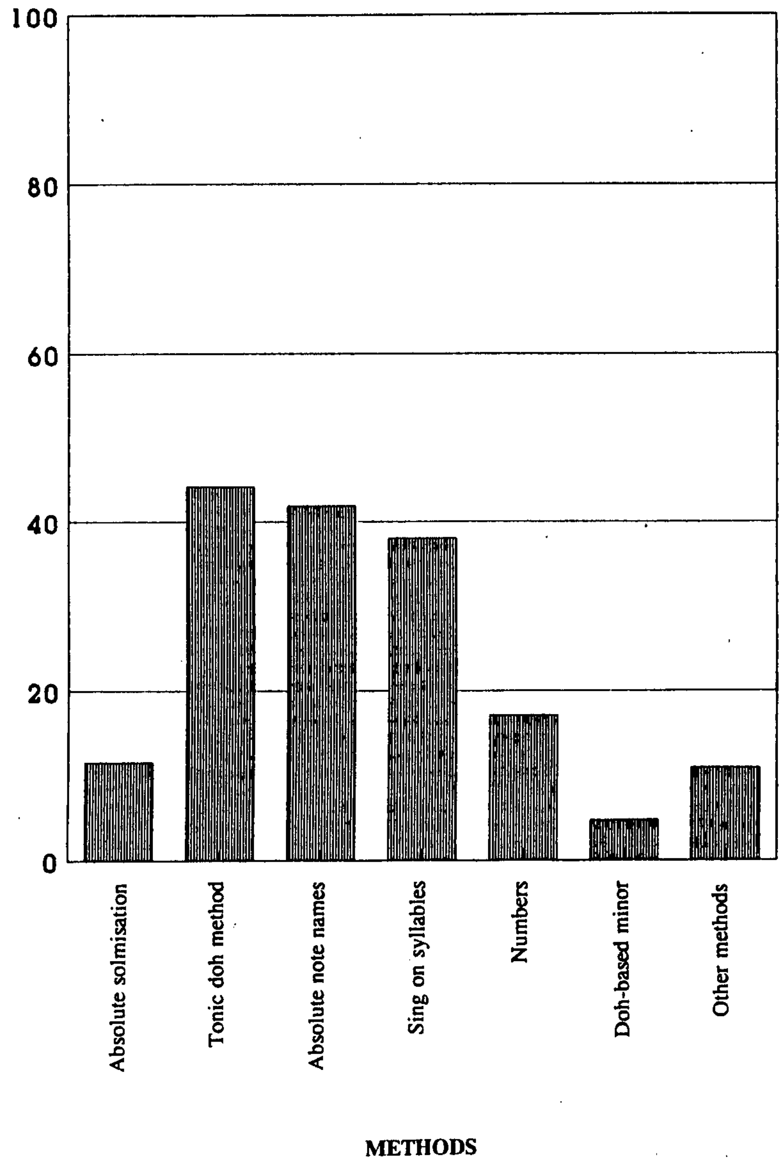


Fig. 16 Number of Sight Singing methods per lecturer in ALL three countries

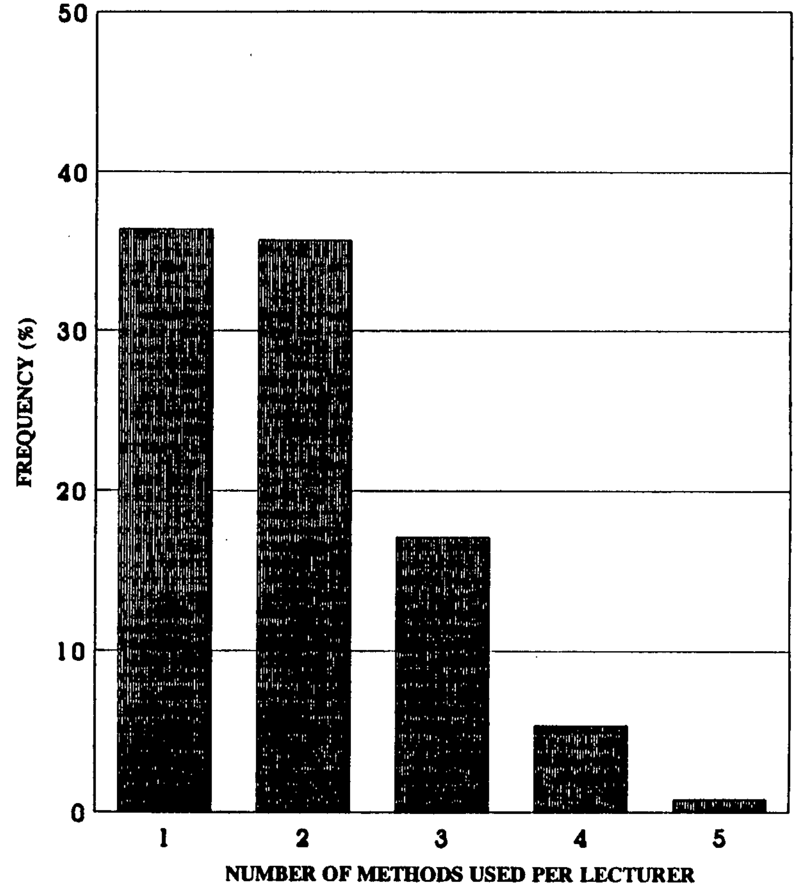


Fig. 17 Style periods used for Aural Analysis: RSA

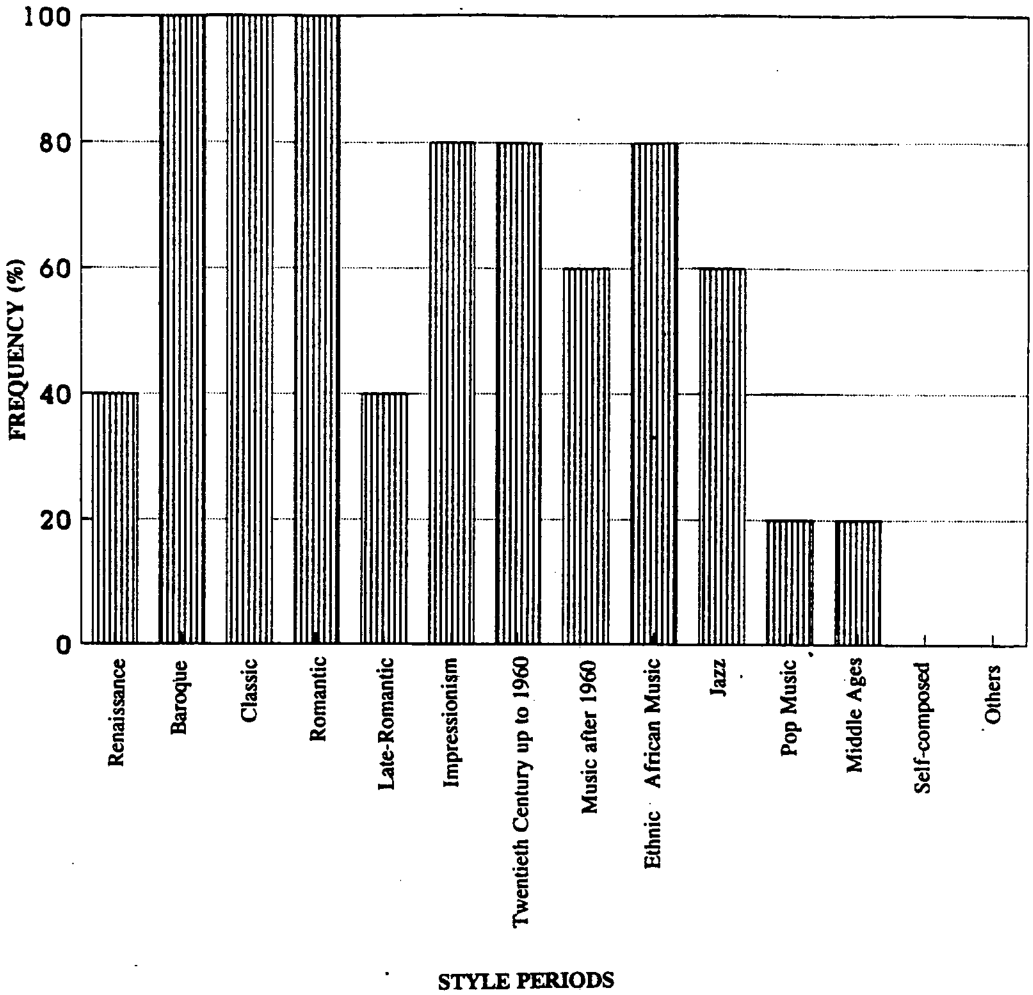


Fig. 18 Style periods used for Aural Analysis: FRG

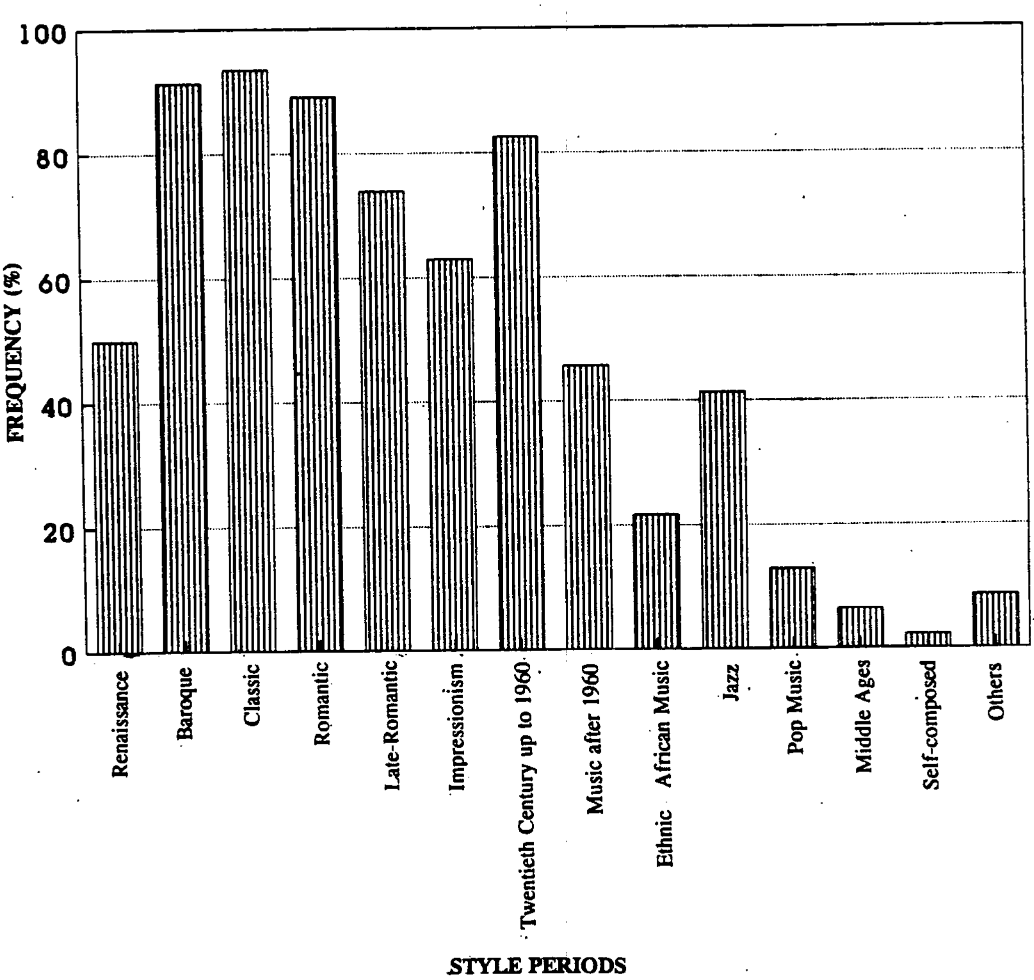


Fig. 19 Style periods used for Aural Analysis: USA

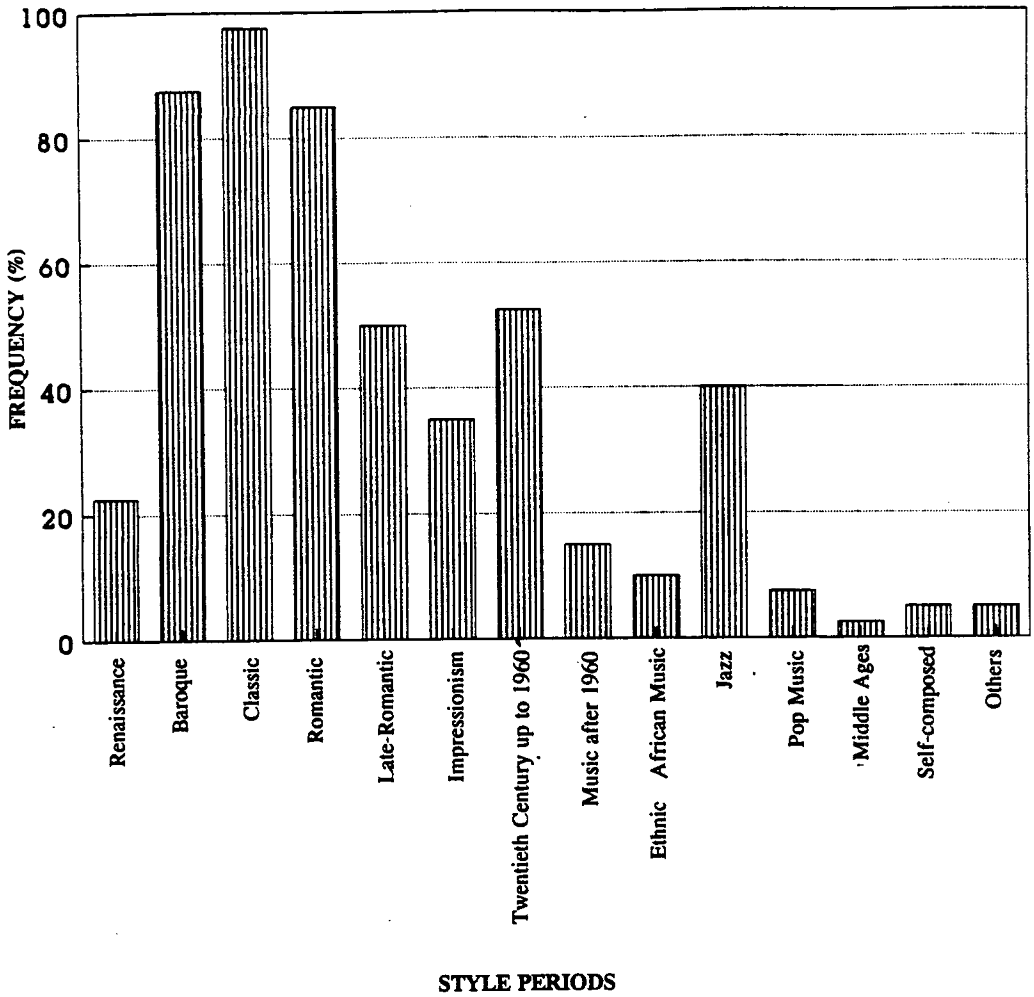


Fig. 20 Style periods used for Aural Analysis: ALL

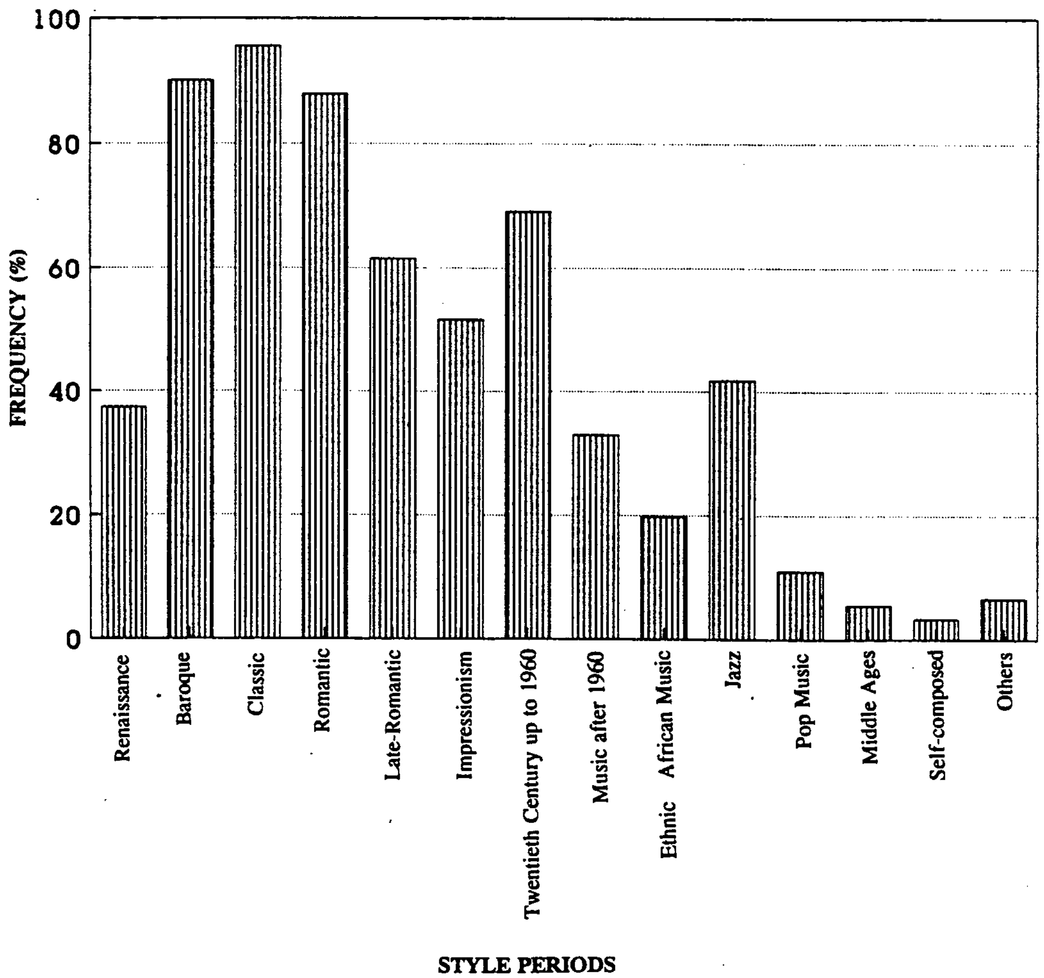


Fig. 21 Efficiency of CAT in the RSA: Improved skills

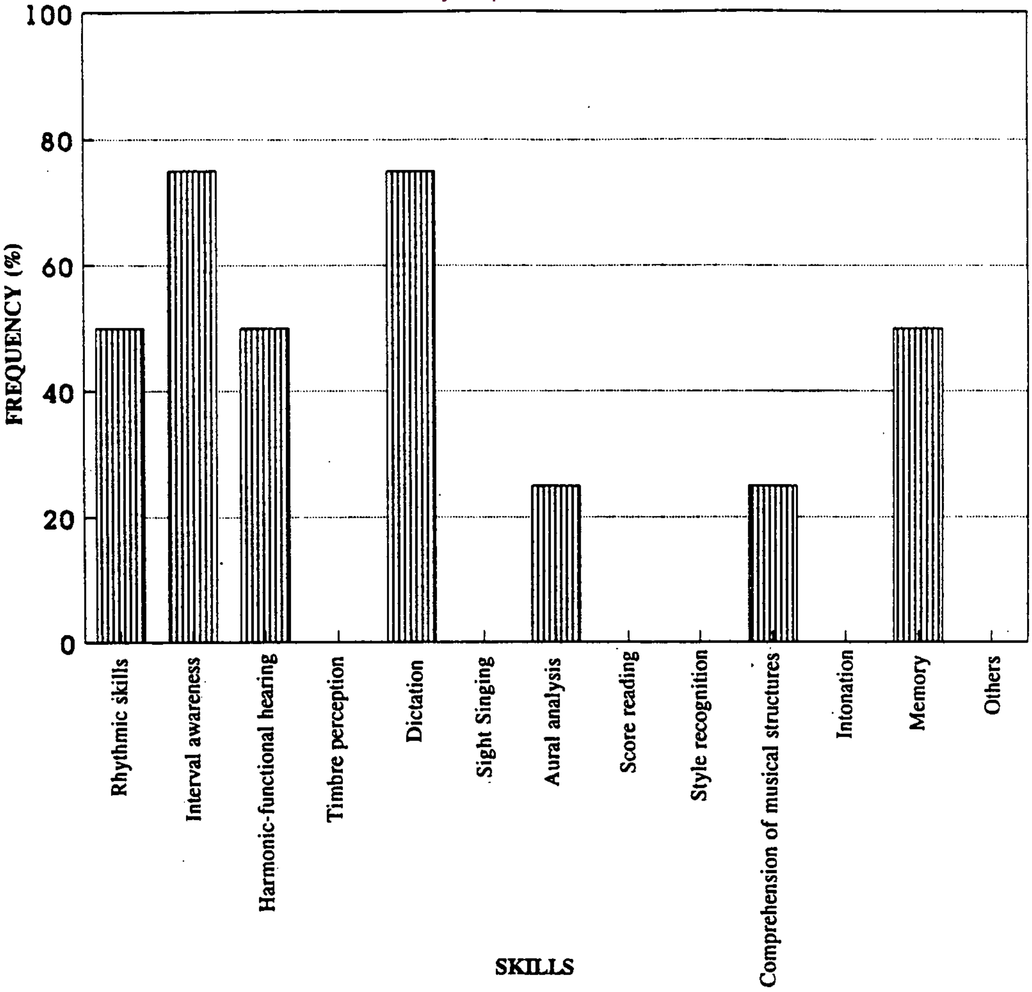


Fig. 22 Efficiency of CAT in the FRG: Improved skills

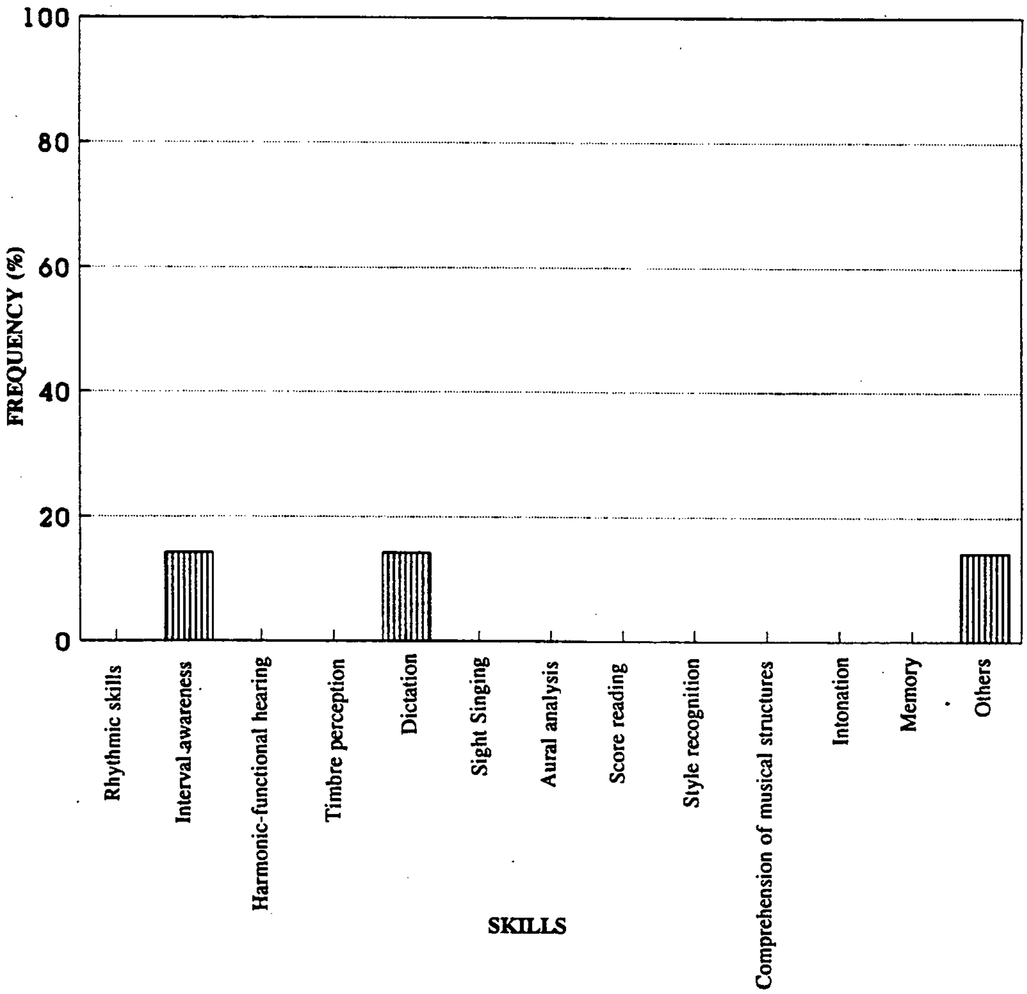


Fig. 23 Efficiency of CAT in the USA: Improved skills

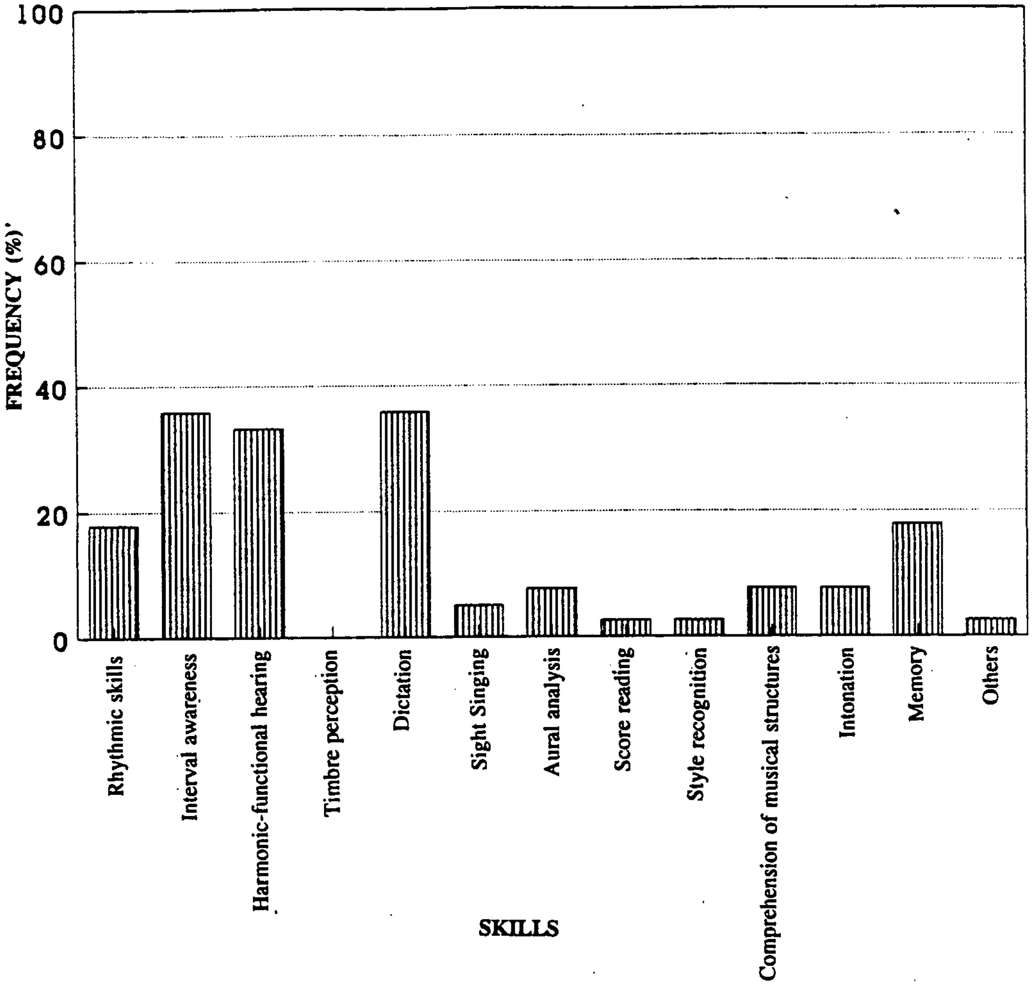
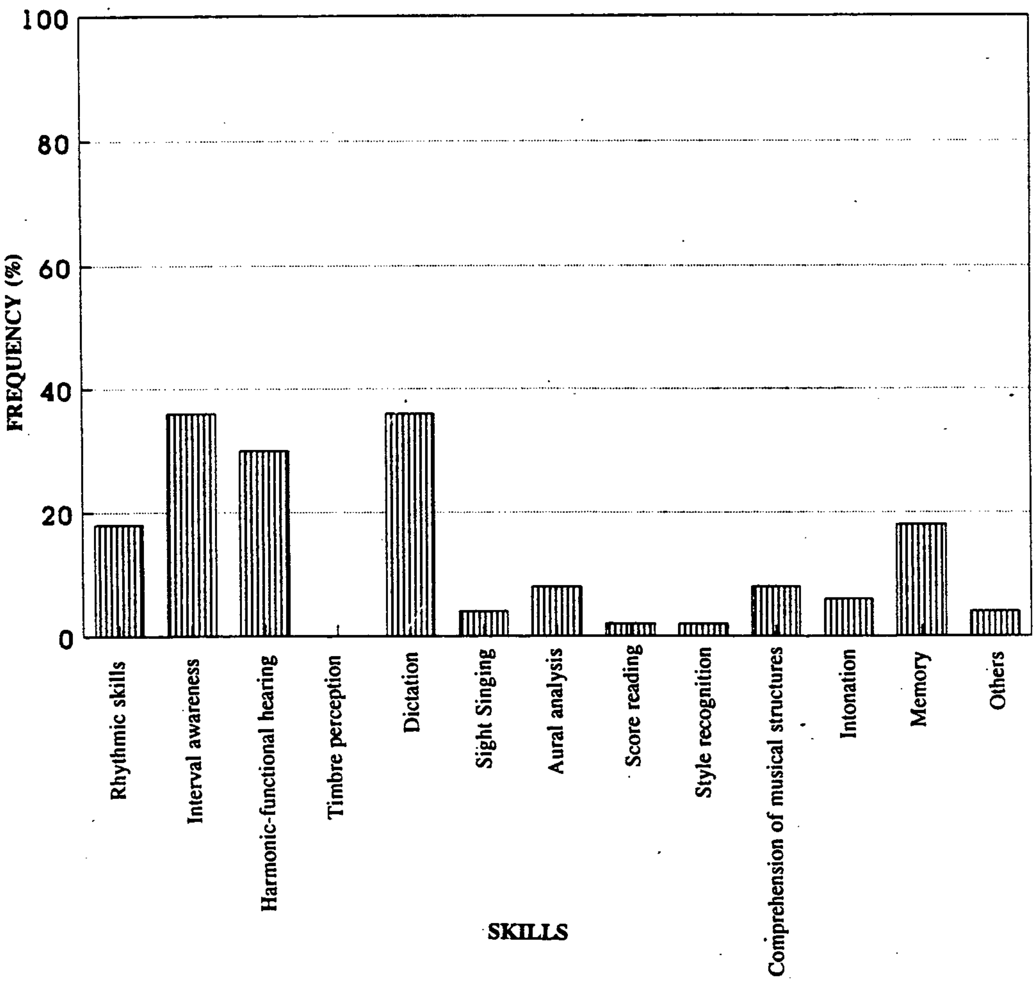


Fig. 24 Efficiency of CAT in ALL three countries: Improved skills



APPENDIX H

Tel.: (0711) 62 84 63

Hasenbergsteige 37

7000 Stuttgart 1
DUITSLAND

Februarie 1991

Geagte Prof./Dr./Mnr./Mev./Mej.

As ingeskrewe doktorsgraadstudent aan die Universiteit van Stellenbosch is ek besig met navorsing op die gebied van **gehooropleiding**. Dr. Paul Loeb van Zuilenburg is my promotor.

'n Oorsese beurs van die "Deutscher Akademischer Austauschdienst" het dit vir my moontlik gemaak om oor verskillende metodes van gehooropleiding in Duitsland na te vors.

Die ingeslote vraelys vorm deel van 'n uitgebreide studie waarin tradisionele en rekenaargesteunde gehooropleiding, asook musiekpsigologiese aspekte van gehooropleiding ondersoek word. Die doel van hierdie navorsing is om voorstelle vir 'n nuwe benadering tot die metodiek van gehooropleiding te doen.

Ek sal dit hoog op prys stel indien u my met my navorsing kan help deur die vraelys te voltooi, en dit voor einde **Mei 1991** terug te stuur.

By voorbaat dank!

Met vriendelike groete

(Mev.) Anri Herbst

NAVORSINGSPROJEK
1991:
VRAE OOR GEHOOROPLEIDING

'n Paar riglyne by die invul van die vraelys

1. Dit is raadsaam om die vrae eers oorsigtelik deur te lees. U sal merk dat die vraagvolgorde 'n logiese riglyn vir die beantwoording daarstel.

2. In die meeste gevalle is meer as een antwoord moontlik. Indien u die gegewe moontlikhede ontoereikend vind, kan u u eie antwoorde op ekstra blaaie insluit. Dit geld ook vir gevalle waar die skryfruimte onvoldoende is. Merk asb. baie duidelik op u aparte blad/blaaie die vraag/vrae wat u kommentarieer.

3. U antwoorde word streng vertroulik behandel en geensins evalueer in terme van reg of verkeerd nie.

Baie dankie vir u deelname!

Vrae

1. Naam van Universiteit/Technikon waar u onderrig:..
....

2. Word gehooropleiding aan u Universiteit/Technikon aangebied as
(a) 'n selfstandige vak?
(b) deel van musiekteorie?
(c) deel van...?
(bv. ritmiese kursusse of danskursusse, instrumentale onderrig, ens.)

3. Beskou u gehooropleiding (dui asb. slegs een antwoord aan)
(a) as 'n vak wat hoofsaaklik tot die ondersteuning van gesang-, instrumentale en musiekteoretiese onderrig dien (as hulpvak)?
(b) as 'n vak met eie doelstellings? Watter? (slegs enkele trefwoorde)..
....
....
....
....

4. Hoeveel onderrigtyd vir gehooropleiding is weekliks per student tot u beskikking?.......................

5. Die onderrigtyd tot my beskikking is
(a) voldoende
(b) onvoldoende

6. Het u assistente in die vak gehooropleiding wat hulp aan swakker studente verleen?
(a) Ja
(b) Nee

7. Geskied u gehooronderrig as
(a) individuele onderrig?
(b) groepsonderrig?

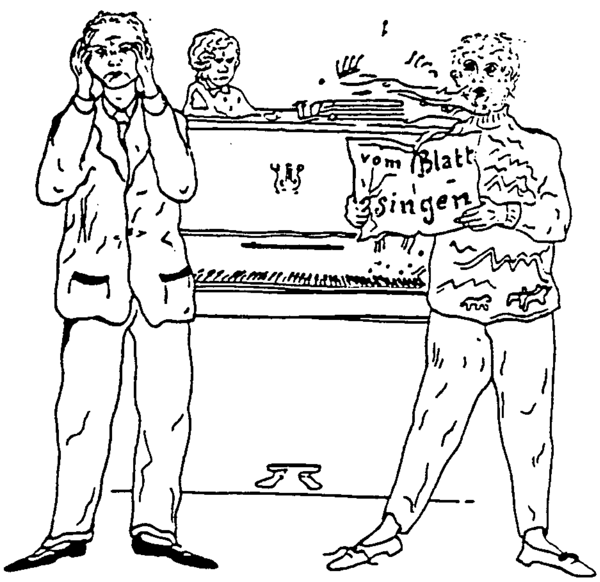
8. Indien u groepsonderrig aangedui het, hoe groot is die groep(e)?..

9. Verkies u
(a) individuele onderrig?
(b) groepsonderrig?
(c) individuele en groepsonderrig?

10. Wat is vir u die **ideale** groepsgrootte?..

11. Watter van die volgende werkwyses sluit u in u gehooronderrig in?
   (a) Liggaamsbewegings
      (i) Handtekens (Tonika-Do)
      (ii) Aanduiding van maatslag
      (iii) Ander..
   (b) Nasing
   (c) Naklap
   (d) Naspeel op klawerbordinstrumente
   (e) Naspeel op ander instrumente
   (f) Die klop van ritmes van blad
   (g) Bladsang
   (h) Diktee
   (i) Kritiese luister, d.i. die uitwys van verskille tussen die geskrewe partituur en dit wat gehoo word
   (j) Improvisasie
   (k) Grafiese voorstellings van algemeen maklik waarneembare buitelyne/detail van voorgespeelde musiekvoorbeelde
   (l) Verbale beskrywings van dit wat gehoor is:
      (i) met musiekteoretiese terminologie
      (ii) vry ontwikkelde begrippe en beskrywings (bv. m.b.v. assosiasies)
   (m) Ander:..
   ....

12. Watter metode(s) gebruik u by die ontwikkeling van 'n toonvoorstellingsvermoë?
   (a) Absolute solmisasie (gefikseerde do)
   (b) Tonika-do metode (relatiewe do)
   (c) Absolute nootname (C, D, Es, Fis,..)
   (d) Sing op lettergrepe (la,la,..)
   (e) Ander metodes:..
   ....



Sketse deur die kunstenaar Christoph Matz.

13. Maak u gebruik van gepubliseerde handboeke/werkboeke in u gehooropleiding?
    (a) Ja
    (b) Nee

14. Indien Ja, watter handboeke en/of werkboeke? (Skrywer/red., titel, verskyningsjaar en uitgewer(s):...
....
....
....

15. Watter rol speel handboeke/werkboeke in u gehooronderrig? (Dui asb. slegs een antwoord aan.)
    (a) Ek baseer my onderrig op die inhoud van handboeke/werkboeke.
    (b) Ek gebruik handboeke/werkboeke vir inspirasie en vorm daarmee ten dele my onderrig.

16. Gebruik u in u gehooronderrig (dui asb. slegs een antwoord aan)
    (a) slegs musiekliteratuur?
    (b) slegs selfgekomponeerde oefeninge?
    (c) hoofsaaklik musiekliteratuur, met 'n paar selfgekomponeerde oefeninge?
    (d) hoofsaaklik selfgekomponeerde oefeninge, met 'n paar musiekliteratuurvoorbeelde?

17. Vorm "hooranalise" ook 'n deel van u opleidingsprogram? D.i. analise van hele musiekwerke of grotere dele daaruit suiwer op gehoor, sonder die gebruik van 'n partituur. (Bv. Die eerste beweging van 'n sonate word analiseer t.o.v. karakter, vorm, harmonie, melodie, stylkenmerke ens. deur slegs herhaaldelik daarna te luister.)
    (a) Ja
    (b) Nee

18. Indien u Nee op vraag 17 geantwoord het, wat is u rede(s) daarvoor?
    (a) Ek vind hooranalise nie prakties uitvoerbaar nie.
    (b) Dit is vir my 'n nog onbekende terrein.
    (c) Ander redes: ....
    ....
    ....
    ....

19. Indien hooranalise deel van u gehoorprogram is, watter stylperiodes sluit u in?
    (a) Renaissance
    (b) Barok
    (c) Klassiek
    (d) Romantiek
    (e) Laat-Romantiek
    (f) Impressionisme
    (g) Musiek van die Twintigste Eeu tot 1960
    (h) Musiek na 1960
    (i) Etniese Afrika musiek
    (j) Jazz
    (k) Ander ....

20. In verband met publikasies, kommunikasie en navorsing van gehooropleidingsmetodiek: (Dui asb. drie van die volgende stellings aan.)
   (a) Daar verskyn voldoende **artikels** oor die metodiek van gehooropleiding in vaktydskrifte.
   (b) Ek sou graag meer **artikels** oor die metodiek van gehooropleiding in vaktydskrifte wou sien.
   (c) Leerkragte in die vak gehooropleiding het voldoende **vakgeoriënteerde kontak** met mekaar.
   (d) Ek sou graag meer **studiekringe en werkwinkels** oor die metodiek van gehooropleiding wou sien.
   (e) Daar word voldoende oor die metodiek van gehooropleiding **nagevors**.
   (f) Daar behoort meer oor die metodiek van gehooropleiding **nagevors** te word.

21. Maak u gebruik van die rekenaar in u gehooronderrig?
   (a) Ja
   (b) Nee

Indien Ja, gaan asb. na bladsy 6, vraag 29.

Indien Nee, beantwoord asb. die vrae 22 tot 28.

22. Waarom maak u nie van die rekenaar in u gehooronderrig gebruik nie?
   (a) My kennis van bestaande gehoorprogramme is onvoldoende.
   (b) Ek het vakkundig-metodiese besware.
   (c) Die finansiële belasting te groot.
   (d) Ander redes:...
   ....
   ....
   ....

23. Indien u vraag 22b aangedui het, watter van die volgende vakkundig-metodiese besware is van toepassing?
   (a) Ek beskou gesintetiseerde klanke as onnatuurlik en onesteties.
   (b) Enkelelemente soos intervalle en akkoorde word slegs buite 'n musikale konteks geoefen.
   (c) Rekenaarprogramme is te beperk.
   (d) Die bykomende tegniese omstandighede soos die regte kabelaansluiting, kombinasies van skakelaars ens, ontmoedig my.
   (e) Programme is nie verbruikersvriendelik nie.
   (f) Ander redes...
   ....
   ....
   ....

24. Watter van die volgende rekenaar-program-moontlikhede sou u in u gehooropleiding wou gebruik? Dui ook dit aan wat vir u utopies voorkom.
   (a) Program-moontlikhede om bladsang m.b.v. die rekenaar te kontroleer vir interval, intonasie en ritmiese foute.
   (b) Programme waar die onderwyser sy eie musiekvoorbeelde en literatuurvoorbeelde kan programmeer (gebruik).
   (c) **Perfek** gemonsterde ("sampled") klanke. (Klanke van tradisionele musiekinstrumente wat deur rekenaarprogramme/sintetiseerders/"samplers" perfek daargestel word.)
   (d) Programme waarin kort uittreksels van werke voorgespeel word en vrae oor karakter styl, vorm, harmonie ens. gevra word.
   (e) Die moontlikheid om musiek van plate/laserskywe ens. m.b.v. die rekenaar vir onderrigdoeleindes te verwerk. ("Hyper-Media")
   (f) Die moontlikheid om 'n partituur m.b.v. 'n leesapparaat op die monitor te projekteer, om dan akkoorde, enkele stempartye, instrumentegroepe ens. te selekteer en te laat klink.
   (g) Programme met musiekliteratuurvoorbeelde (partituur verskyn op die beeldskerm), waar klinkende stempartye en/of dele van die partituur na willekeur weggelaat kan word. Dit bied die moontlikheid tot bladsang en improvisasie binne 'n musikale konteks.
   (h) Ander moontlikhede/utopieë:..
   ....
   ....
   ....

25. Gebruik u ander "gehoorprogramme" wat nie rekenaargebonde is nie?
   (a) Nee
   (b) Musiekvoorbeelde op magnetiese toonband/kasset(te) vir dikteedoeleindes.
   (c) Musiekvoorbeelde op magnetiese toonband/kasset(te) met vrae en meerkeusige antwoorde.
   (d) "Spooktekste": dele van 'n partituur word weggelaat en die student moet na aanleiding van wat hy/sy hoor en afhangende van die opdrag, die ontbrekende materiaal invoeg.
   (e) Ander:..
   ....
   ....
   ....
   ....

26. Gee asb. 'n kort omskrywing van die "gehoorprogram(me)" wat u in vraag 25 aangedui het m.b.t. inhoud, aard en doel:..
....
....
....
....

27. Sou u belangstel in 'n werkswinkel oor die aanwending van die rekenaar in gehooropleiding?
   (a) Ja
   (b) Nee

28. Watter aspekte van Gehooropleiding ontbreek in hierdie vraelys en behoort aangespreek te word?..
....
....
....
....
....

Indien u <u>nie</u> die rekenaar in u gehooronderrig gebruik nie, het u nou die einde van die vraelys bereik.
Baie dankie vir u geduld en moeite!

Indien u die rekenaar in gehooronderrig gebruik, voltooi asb. die vraelys vanaf vraag 29.

29. Watter rekenaarprogramme gebruik u?
   (a) Kommersieel beskikbare programme (software): Naam/Name van programme en adres(se) van verspreider(s):..
   ....
   ....
   (b) Selfgeprogrammeerde programme

30. In verband met kommersieel beskikbare programme: waarom het u hierdie spesifieke program(me) gekies?..
....
....
....
....
....

31. Indien u "selfgeprogrammeerde programme" in vraag 29 aangedui het, wat is u redes vir die ontwerp van 'n eie program?
   (a) Programmering is 'n interessante veld en ek wou eie idees ontwikkel.
   (b) Ek is ontevrede met kommersieel beskikbare programme.
   (c) My program bied ander moontlikhede as die kommersieel beskikbare programme. Watter?..
   ....
   ....
   ....
   (d) Ander redes:..
   ....
   ....
   ....
   ....

32. Sou u bereid wees om u selfgeprogrammeerde program vir navorsingsdoeleindes beskikbaar te stel? Vanselfsprekend word gewaarborg dat die program nie sonder u toestemming gekopieer of gesirkuleer sal word nie. Indien u sou instem: wat is u adres?
   (a) Ja..
   ....
   (b) Nee

33. Watter rekenaar gebruik u:
   (a) IBM/IBM aanpasbaar
   (b) Apple Macintosh
   (c) Atari
   (d) Ander..

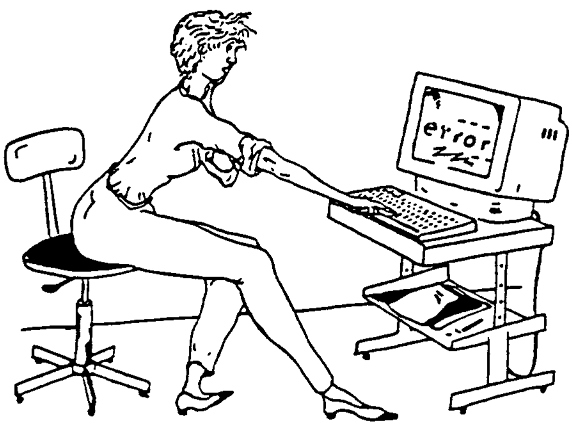
34. Watter sintetiseerder/"keyboard"/"sampler" (indien enige) gebruik u saam met u rekenaar? Gee asb. die volledige naam, bv. Roland D70:..
....

35. Watter van die onderstaande stellings is van toepassing op u onderrigsituasie?
(a) Die rekenaar word slegs as "oefeninstrument" gebruik, buite die onderrigsituasie, as deel van huiswerkopdragte.
(b) Die rekenaar word slegs as deel van my onderrig aangewend.
(c) Die rekenaar word as deel van my onderrig en as oefeninstrument aangewend.

36. Watter studente gebruik die rekenaar?
(a) slegs onderpresteerders
(b) slegs goeie presteerders
(c) alle studente

37. Vind u dat u studente se gehoorprestasie **merkbaar** verbeter het sedert u die rekenaar in u gehooronderrig gebruik?
(a) Ja
(b) Nee
(c) Ek gebruik die rekenaar nog nie lank genoeg nie, en kan dus nie kommentaar op hierdie vraag lewer nie.

38. Indien u Ja op vraag 37 geantwoord het, watter aspekte het verbeter?
(a) Ritmiese vaardighede
(b) Intervalbewussyn
(c) Harmonies-funksionele gehoor
(d) Klankkleur
(e) Diktee
(f) Bladsang
(g) Hooranalise
(h) Partituurlees
(i) Stylherkenning
(j) Verstaan van musikale strukture
(k) Intonasie
(l) Geheue
(m) Ander..



39. Watter van die volgende rekenaar-program-moontlikhede sou u in u gehooropleiding wou gebruik? Dui ook dit aan wat vir u utopies voorkom.
(a) Program-moontlikhede om bladsang m.b.v. die rekenaar te kontroleer vir interval, intonasie en ritmiese foute.
(b) Programme waar die onderwyser sy eie musiekvoorbeelde en literatuurvoorbeelde kan programmeer (gebruik).
(c) **Perfek** gemonsterde ("sampled") klanke. (Klanke van tradisionele musiekinstrumente wat deur rekenaarprogramme/sintetiseerders/"samplers" perfek daargestel word.)
(d) Programme waarin kort uittreksels van werke voorgespeel word en vrae oor karakter styl, vorm, harmonie ens. gevra word.
(e) Die moontlikheid om musiek van plate/laserskywe ens. m.b.v. die rekenaar vir onderrigdoeleindes te verwerk. ("Hyper-Media")
(f) Die moontlikheid om 'n partituur m.b.v. 'n leesapparaat op die monitor te projekteer, om dan akkoorde, enkele stempartye, instrumentegroepe ens. te selekteer en te laat klink.
(g) Programme met musiekliteratuurvoorbeelde (partituur verskyn op die beeldskerm), waar klinkende stempartye en/of dele van die partituur na willekeur weggelaat kan word. Dit bied die moontlikheid tot bladsang en improvisasie binne 'n musikale konteks.
(h) Ander moontlikhede/utopië:..
....
....
....
....

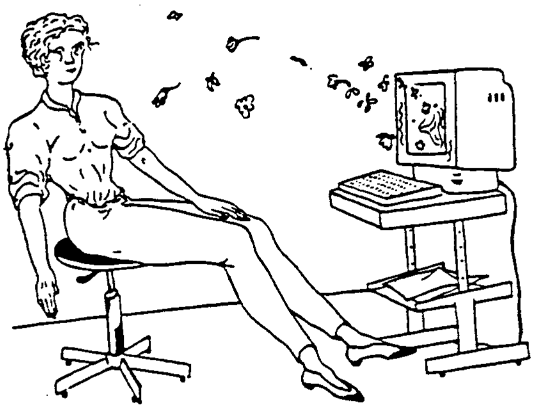
40. Gebruik u ander "gehoorprogramme" wat **nie** rekenaargebonde is nie?
(a) Nee
(b) Musiekvoorbeelde op magnetiese toonband/kasset(te) vir dikteedoeleindes.
(c) Musiekvoorbeelde op magnetiese toonband/kasset(te) met vrae en meerkeusige antwoorde.
(d) "Spooktekste": dele van 'n partituur word weggelaat en die student moet na aanleiding van wat hy/sy hoor en afhangende van die opdrag, die ontbrekende materiaal invoeg.
(e) Ander:..
....
....
....
....

41. Gee asb. 'n kort omskrywing van die "gehoorprogram(me)" wat u in vraag 40 aangedui het m.b.t. inhoud, aard en doel:..
....
....
....
....

42. Sou u belangstel in 'n werkswinkel oor die aanwending van die rekenaar in gehooropleiding?
   (a) Ja
   (b) Nee

43. Watter aspekte van Gehooropleiding ontbreek in hierdie vraelys en behoort aangespreek te word?..
....
....
....
....
....

U het nou die einde van hierdie vraelys bereik. Baie dankie vir u geduld en moeite!



APPENDIX I

Tel.: (0711) 62 84 63

Hasenbergsteige 37
7000 Stuttgart 1

Februar 1991

Sehr geehrte Damen und Herren,

ich bin Doktorandin an der Universität von Stellenbosch (Südafrika) und befasse mich mit dem Fach Gehörbildung. Mein Doktorvater ist Dr. Paul Loeb van Zuilenburg.

Ein DAAD-Stipendium hat es mir ermöglicht, Methoden der Gehörbildung an deutschen Musikhochschulen zu untersuchen.

Der angeschlossene Fragebogen ist Teil einer umfassenderen Arbeit, die neben traditioneller Gehörbildung auch Untersuchungen zu Computerverwendung, Höranalyse und Musikpsychologie einbezieht. Daraus sollen Grundlagen für neue Methoden der Gehörbildung entwickelt werden.

Ich würde mich sehr freuen, wenn Sie mich durch die Beantwortung der Fragen bei meiner Forschungsarbeit unterstützen würden. Darf ich Sie bitten, den Fragebogen möglichst bis Ende **Mai 1991** zurückzuschicken?

Vielen Dank.

Mit freundlichen Grüßen

Ihre Anri Herbst

Anlagen

FORSCHUNGSPROJEKT
1991:
FRAGEN ZUR GEHÖRBILDUNG

Empfehlungen zum Ausfüllen des Fragebogens

1. Es ist ratsam, sich zunächst einen Überblick über die Fragen zu verschaffen. Sie werden sehen, daß die Logik der Fragenfolge Sie zuverläßig leitet.

2. Je nach Frage entscheiden Sie, ob Sie mehrere Antworten ankreuzen. Wenn Ihnen die vorgegebenen Antworten nicht zureichend erscheinen, erläutern Sie dies bitte auf einem gesonderten Blatt (bitte mit genauer Angabe, zu welcher Frage dies gehört.) Dies gilt auch, wenn der vorgesehene Platz für Antworten nicht aus-reicht.

3. Selbstverständlich werden die Antworten keinerlei Bewertungen unterzogen und streng vertraulich behandelt.

Vielen Dank für Ihre Teilnahme!

Fragen

1. Name der Hochschule, an der Sie unterrichten:..
....

2. An Ihrer Hochschule wird Gehörbildung angeboten
   (a) als eigenständiges Fach?
   (b) innerhalb des musiktheoretischen Unterrichts?
   (c) innerhalb
   von..?
   (z.B. rhythmischer Erziehung oder Tanzausbildung, usw.)

3. Sehen Sie Gehörbildung als (bitte nur eine Antwort ankreuzen)
   (a) ein Fach, das im wesentlichen zur Unterstützung der Gesangs- und Instrumentalausbildung und des musiktheoretischen Unterricht dient? (als Hilfsfach)
   (b) ein Fach mit eigenständigen Erkenntnisformen? Welche? (Stichworten)..............................
   ....
   ....
   ....
   ....

4. Wieviel Unterrichtszeit steht Ihnen wöchentlich pro Student zur Verfügung?................................

5. Die mir zur Verfügung stehende Unterrichtszeit ist
   (a) ausreichend
   (b) nicht ausreichend

6. Gibt es bei Ihnen im Fach Gehörbildung Tutoren, die Stützkurse für schwächere Studenten anbieten?
   (a) Ja
   (b) Nein

7. Erfolgt Ihr Gehörbildungsunterricht als
   (a) Einzelunterricht?
   (b) Gruppenunterricht?

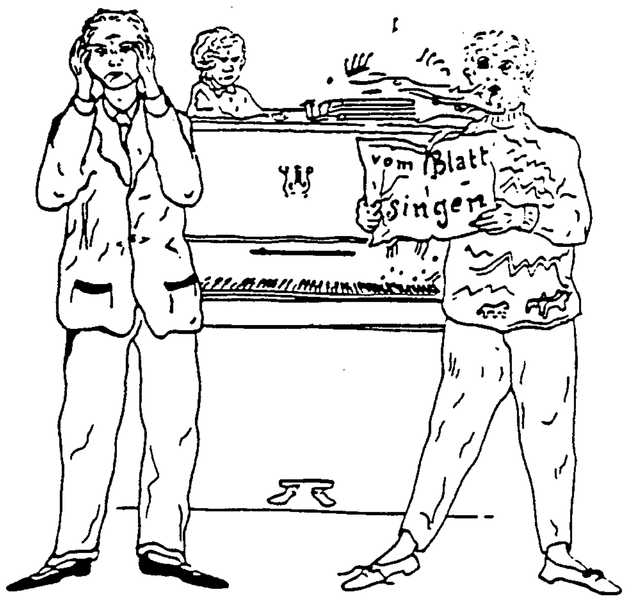
8. Bei Gruppenunterricht: Wieviele Teilnehmer pro Gruppe?...

9. Welche Unterrichtsform bevorzugen Sie?
   (a) Einzelunterricht
   (b) Gruppenunterricht
   (c) Ich unterrichte in beiden Formen gleich gern.

10. Welche Teilnehmerzahl ist für Sie ideal?..

11. Welche der folgenden Arbeitsformen verwenden Sie in Ihrem Gehörunterricht?
(a) Körperbewegungen
  (i) Handzeichen (Tonika-Do)
  (ii) Taktschlagen
  (iii) Andere..
(b) Nachsingen
(c) Nachklopfen
(d) Nachspielen auf Tasteninstrumenten
(e) Nachspielen auf anderen Instrumenten
(f) Rhythmen vom Blatt klopfen
(g) Vom-Blatt-Singen
(h) Diktate
(i) Fehlerhören, d.h. Nachweis von Unterschieden zwischen Notentext und Gehörtem
(j) Improvisation
(k) Graphische Darstellungen von musikalischen Verläufen/Details von Hörbeispielen
(l) Verbale Beschreibungen von Hörbeispielen:
  (i) mit musiktheoretischer Terminologie
  (ii) mit frei erfundenen Begriffen
(m) Andere:..
....

12. Welche Methode(n) verwenden Sie zur Entwicklung des Tonvorstellungsvermögens?
(a) Absolute Solmisation ("fixed" do)
(b) Tonika-do-Methode (mit relativem do)
(c) Absolute Tonnamen (C, D, Es, Fis,..)
(d) Singesilben (la,la,..)
(e) Andere Methoden:..
....
....



Die Zeichnungen wurden mir dankenswerterweise von Christoph Matz zur Verfügung gestellt.

13. Verwenden Sie im Druck erschienene Gehörbildungslehrbücher/Übungssammlungen?
    (a) Ja
    (b) Nein

14. Wenn Ja, welche? (Autor/Herausgeber, Titel, Erscheinungsjahr und Verlag):..............................
....
....
....
....

15. Welche Rolle spielen Lehrbücher/Übungssammlungen in Ihrem Unterricht? (Bitte nur eine Antwort ankreuzen.)
    (a) Grundlage meines Unterrichts sind Lehrbücher/Übungssammlungen.
    (b) Ich verwende Lehrbücher/Übungssammlungen als Anregung. Sie sind Teil meiner Unterrichtsgestaltung.

16. Verwenden Sie im Gehörunterricht (bitte nur eine Antwort ankreuzen)
    (a) **nur** Literaturbeispiele?
    (b) **nur** selbstkomponierte Übungsbeispiele?
    (c) hauptsächlich Literaturbeispiele, mit einigen selbstkomponierten Übungsbeispielen?
    (d) hauptsächlich selbstkomponierte Übungsbeispiele, mit einigen Literaturbeispielen?

17. Gehört zu Ihrem Unterrichtsprogramm auch Höranalyse, d.h. die Analyse ganzer Stücke oder größerer Teile nur über das Hören?
    (a) Ja
    (b) Nein

18. Wenn Nein, was sind Ihre Gründe dafür?
    (a) Ich halte Höranalyse für nicht praktikabel.
    (b) Es ist für mich ein noch unbekanntes Feld.
    (c) Andere Gründe:...
    ....
    ....
    ....

19. Welche Stilperioden verwenden Sie im Fall von Höranalyse?
    (a) Renaissance
    (b) Barock
    (c) Klassik
    (d) Romantik
    (e) Spät-Romantik
    (f) Impressionismus
    (g) Musik des 20. Jahrhunderts bis 1960
    (h) Musik nach 1960
    (i) Ethnische afrikanische Musik
    (j) Jazz
    (k) Andere Musik:...

20. Zur Publikation, Fortbildung und Forschung der Gehörbildungsmethodik: (Bitte drei Antworten ankreuzen.)
(a) Es gibt genügend **Artikel** zur Gehörbildungsmethodik in Fachzeitschriften.
(b) Ich wünsche mir mehr **Artikel** zur Gehörbildungsmethodik in Fachzeitschriften.
(c) Es gibt genügend **Fachtreffen** für Lehrkräfte der Gehörbildung.
(d) Ich wünsche mir mehr Workshops/**Fachtreffen** und Arbeitskreise zur Gehörbildungsmethodik.
(e) Zur Methodik der Gehörbildung wird genügend **Forschung** getrieben.
(f) Es sollte mehr über die Methodik der Gehörbildung **geforscht** werden.

21. Verwenden Sie Computer in Ihrem Gehörunterricht?
(a) Ja
(b) Nein

Wenn **Ja**, bitte weiter auf Seite 6 Frage 29.

Wenn **Nein**, bitte Fragen 22 bis 28 beantworten.

22. Warum machen Sie im Gehörunterricht keinen Gebrauch von Computern?
(a) Ich kenne die verfügbaren Gehörprogramme (Software) nicht.
(b) Ich habe fachlich-methodische Bedenken.
(c) Die finanzielle Belastung ist zu groß.
(d) Andere Gründe..
....
....
....
....

23. Zu 22b: Welche der folgenden fachlich-methodischen Gründe treffen zu?
(a) Ich finde die synthetischen Klänge unnatürlich und unästhetisch.
(b) Einzelelemente wie Intervalle und Akkorde werden nur ausserhalb des musikalischen Kontextes ge-übt.
(c) Computerprogramme sind zu eingeschränkt.
(d) Mich stören die technischen Begleitumstände.
(e) Die Programme sind nicht benutzerfreundlich.
(f) Andere Gründe:..
....
....
....
....

24. Welche Eigenschaften von Computerprogrammen zur Gehörbildung erscheinen Ihnen wünschenswert für Gehörbildung? Markieren Sie auch Eigenschaften, die Ihnen utopisch erscheinen.

(a) Programme, die beim Vom-Blatt-Singen Intervall- und Intonationsfehler und falsche Rhythmen an-geben.
(b) Programme, in die der Lehrer eigene Beispiele und Literaturbeispiele einfügen kann.
(c) **Perfekt** gesampelte Klänge (d.h. Klänge, die in Computerprogrammen/Synthesizern/Samplern verwendet werden, die traditionellen Musikinstrumenten perfekt entsprechen.)
(d) Programme, die kurze Literaturbeispiele vorspielen und nach Charakter, Stil, Gattung, Form, Harmonik usw. fragen.
(e) Die Möglichkeit, Musik von Tonträgern (Schallplatte/CD usw.) durch den Computer für den Unterricht zu verarbeiten. (Hyper-Media)
(f) Die Möglichkeit, mit Hilfe eines Lesegeräts eine Partitur auf den Bildschirm zu projizieren, um dann Akkorde, einzelne Stimmen, Instrumentengruppen usw. auswählen und erklingen lassen zu können.
(g) Programme mit Literaturbeispielen (Partitur erscheint auf dem Bildschirm), bei denen sowohl klingende Stimmen, als auch Stimmen im Notentext weggelassen werden können. (Möglichkeit, im Kontext vom Blatt zu singen, zu improvisieren, usw.)
(h) Andere Möglichkeiten, auch utopische:..
....
....
....
....

25. Verwenden Sie andere "Gehörprogramme" (**nicht** computergebunden)?

(a) Nein
(b) Musikbeispiele auf Tonband/Kassetten für Diktate.
(c) Musikbeispiele auf Tonband/Kassetten, die nach dem multiple-choice-Verfahren (Fragen mit aus-wählbaren Antworten) bearbeitet werden.
(d) "Lückentexte": d.h. Notentexte, in denen einzelne Akkorde, Töne, Stimmen fehlen und nach Gehör auf verschiedene Weise ergänzt werden können.
(e) Andere...
....
....
....
....

26. Beschreiben Sie in Stichworten Ihr(e) "Programm(e)" von Frage 25 nach Inhalt, Art und Ziel:
....
....
....
....
....

27. Sind Sie an einem Workshop zur Verwendung des Computers im Gehörunterricht interessiert?

(a) Ja
(b) Nein

28. Welche Aspekte des Gehörbildungsunterrichts sind in diesem Fragebogen nicht angesprochen worden?...
....
....
....
....
....

Wenn Sie den Computer <u>nicht</u> im Gehörunterricht verwenden, sind sie jetzt am Ende dieses Fragebogens. Vielen Dank für Ihre Geduld und Mühe!

Wenn Sie Computer in Ihrem Gehörunterricht verwenden, ergänzen Sie bitte den Fragenbogen ab Frage 29.

29. Welche Computerprogramme (Software) verwenden Sie?
(a) Im Handel erhältliche Software: Bitte geben Sie Name und Anschrift der Vertriebstelle an:
....
....
....
(b) Selbstprogrammierte Programme

30. Zu im Handel erhältlicher Software: aus welchen Gründen haben Sie diese(s) Programm(e) ausgewählt? ....
....
....
....
....
....

31. Zu 29b: Aus welchen Gründen haben Sie ein eigenes Programm entwickelt?
(a) Programmierung ist für mich ein interessantes Feld und ich wollte eigene Ideen ausprobieren.
(b) Ich bin mit den im Handel erhältlichen Software unzufrieden.
(c) Mein Programm bietet andere Möglichkeiten als die im Handel erhältliche Software. Welche?..
....
....
....
(d) Andere Gründe:..
....
....
....
....

32. Wären Sie bereit, Ihr selbstentwickeltes Programm für Forschungszwecke zur Verfügung zu stellen? Selbstverständlich ist gewährleistet, daß das Copyright erhalten bleibt und das Programm ohne Ihre Einwilligung weder kopiert noch weitergegeben würde. Falls Sie zustimmen: wie lautet Ihre Anschrift?
(a) Ja..
....
(b) Nein

33. Welchen Computer benutzen Sie?
(a) IBM/IBM-kompatibel
(b) Apple Macintosh
(c) Atari
(d) Andere:..

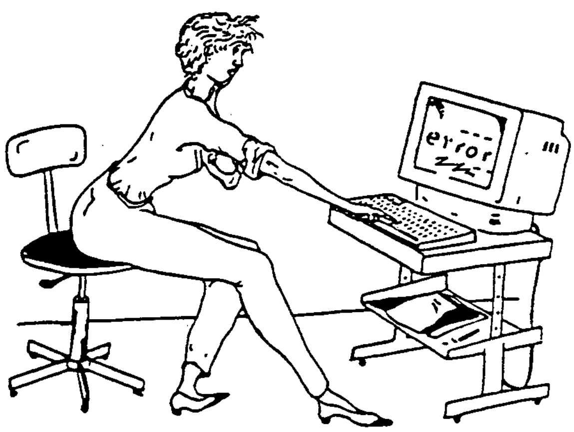
34. Welche Keyboard/Synthesizer/Sampler benutzen Sie im Zusammenhang mit Computern? Bitte geben Sie den Namen vollständig an, z.B. Roland D70:...
....

35. Zum Einsatz des Computers in Ihrem Unterricht:
(a) Der Computer wird **lediglich** außerhalb des Unterrichts als Übungsinstrument für Hausaufgaben verwendet.
(b) Der Computer wird **nur** im Unterricht verwendet.
(c) Der Computer wird im Unterricht und zum Üben benutzt.

36. Welche Studenten benutzen den Computer
(a) nur schwächere Studenten
(b) nur "gute" Studenten
(c) alle Studenten

37. Haben sich die Leistungen Ihrer Studenten seit Benutzung des Computers **deutlich** verbessert?
(a) Ja
(b) Nein
(c) Noch keine Aussage möglich

38. Wenn Ja: in welcher Hinsicht?
(a) Rhythmische Fähigkeiten
(b) Intervallbewußtsein
(c) Harmonisch-funktionales Hören
(d) Klangfarbenhören
(e) Diktate
(f) Vom-Blatt-Singen
(g) Höranalyse
(h) Partiturlesen
(i) Stilerkennung
(j) Verstehen musikalischer Strukturen
(k) Intonation
(l) Gedächtnis
(m) Andere..



39. Welche Eigenschaften von Computerprogramme zur Gehörbildung erscheinen Ihnen wünschenswert für Gehörbildung? Markieren Sie auch Eigenschaften die Ihnen utopisch erscheinen.
(a) Programme, die beim Vom-Blatt-Singen Intervall- und Intonationsfehler und falsche Rhythmen an-geben.
(b) Programme, in die der Lehrer eigene Beispiele und Literaturbeispiele einfügen kann.
(c) **Perfekt** gesampelte Klänge (d.h. Klänge, die in Computerprogrammen/Synthesizern/-Samplern verwendet werden, die traditionellen Musikinstrumenten perfekt entsprechen.)
(d) Programme, die kurze Literaturbeispiele vorspielen und nach Charakter, Stil, Gattung, Form, Harmonik usw. fragen.
(e) Die Möglichkeit, Musik von Tonträgern (Schallplatte/CD usw.) durch den Computer für den Unterricht zu verarbeiten. (Hyper-Media)
(f) Die Möglichkeit, mit Hilfe eines Lesegeräts eine Partitur auf den Bildschirm zu projizieren, um dann Akkorde, einzelne Stimmen, Instrumentengruppen usw. auswählen und erklingen lassen zu können.
(g) Programme mit Literaturbeispielen (Partitur erscheint auf dem Bildschirm), bei denen sowohl klingende Stimmen, als auch Stimmen im Notentext weggelassen werden können. (Möglichkeit, im Kontext vom Blatt zu singen, zu improvisieren, usw.)
(h) Andere Möglichkeiten, auch utopische:..
....
....
....
....

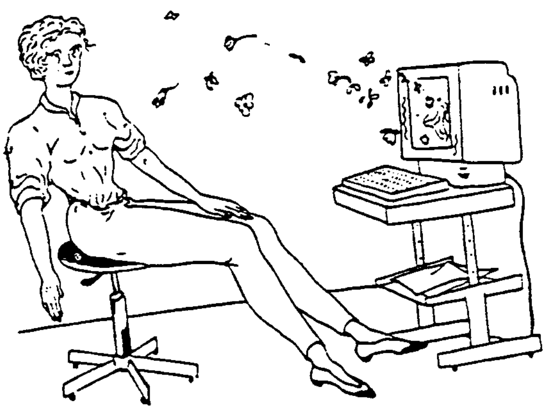
40. Verwenden Sie andere "Gehörprogramme" (**nicht** computergebunden)?
(a) Nein
(b) Musikbeispiele auf Tonband/Kassetten für Diktate.
(c) Musikbeispiele auf Tonband/Kassetten, die nach dem multiple-choice-Verfahren (Fragen mit auswählbaren Antworten) bearbeitet werden.
(d) "Lückentexte": d.h. Notentexte, in denen einzelne Akkorde, Töne, Stimmen fehlen und nach Gehör auf verschiedene Weise ergänzt werden können.
(e) Andere..
....
....
....
....

41. Beschreiben Sie in Stichworten Ihr(e) "Programm(e)" von Frage 40 nach Inhalt, Art und Ziel:.
....
....
....
....
....

42. Sind Sie an einem Workshop zur Verwendung des Computers im Gehörunterricht interessiert?
(a) Ja
(b) Nein

43. Welche Aspekte des Gehörbildungsunterrichts sind in diesem Fragebogen nicht angesprochen worden?..
....
....
....
....
....

Sie sind jetzt am Ende dieses Fragebogens. Vielen Dank für Ihre Zeit und Mühe!



APPENDIX J

EXAMPLES OF ENTRANCE REQUIREMENTS FOR AURAL TRAINING AND FINAL EXAMINATIONS IN AURAL TRAINING[1]

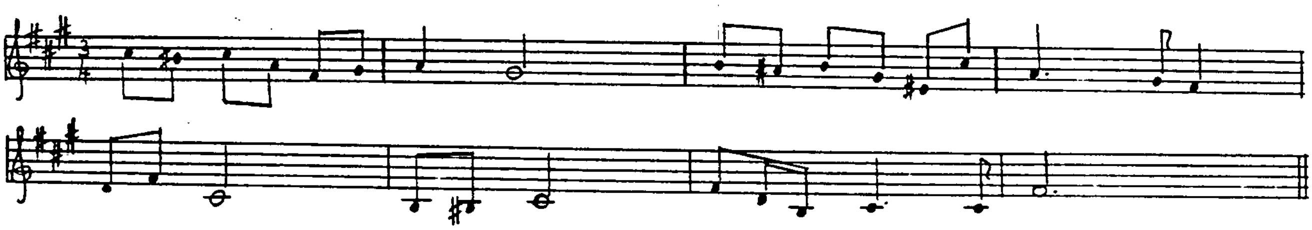
THE REPUBLIC OF SOUTH AFRICA

A. The University of Stellenbosch

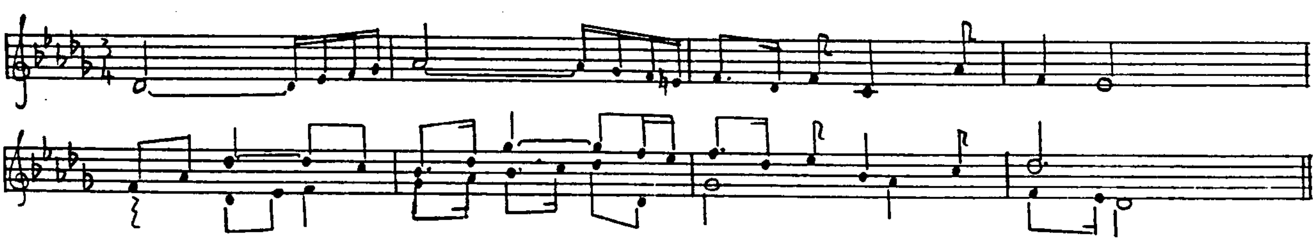
Example of the final examination[2]

1. Example of the written part of the final Aural examination

1.1 One-part dictation



1.2 Two-part dictation



1.3 Four-part dictation

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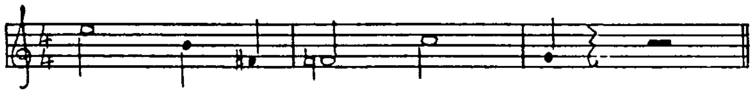
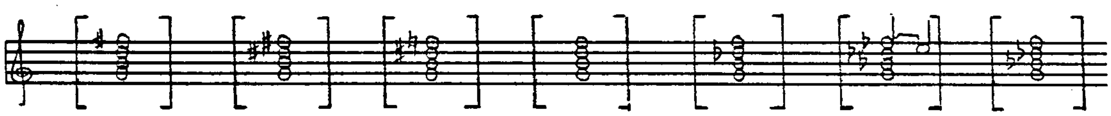
1 The examples are only a sample of what was required at a few music institutions in the three countries and do not claim to be representative of all requirements. At some *Musikhochschulen* different tests and examinations were administered according to the students' main subject. All the different areas in which a student can specialize were not covered in this Appendix. In some cases full details of all the requirements could not be found and only the final requirements for Sight Singing were, for example, included.

2 Apart from other entrance requirements, no additional Aural Training entrance test was required for registering as a music student at the University of Stellenbosch.

1.4 Atonal one-part dictations



1.5 Chord recognition



1.6 Broken chord dictation

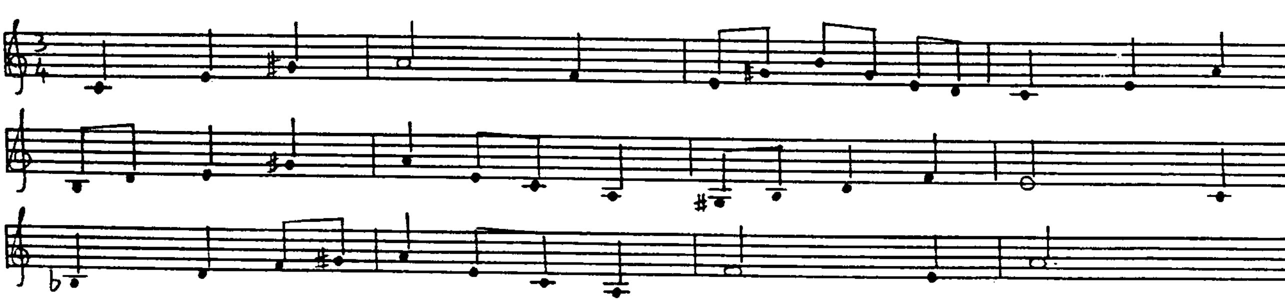
2. Example of the oral part of the final Aural examination

2.1 Sight Singing using Tonic doh syllables

2.2 Sight Singing on absolute note names

2.3 Declamation (intoning) of a rhythmic phrase

2.4 Sight singing exercise based on chords, singing on absolute note names



2.5 Keyboard harmony: Play a cadence in which a French sixth is included

THE FEDERAL REPUBLIC OF GERMANY

A: Hochschule der Künste Berlin

Example of entrance test for prospective school music teachers (SM)[3]

1. You are going to hear 10 harmonic intervals; Indicate the type of each interval. (M = major, m = minor, Trit = augmented 4th, 2 = second, 3 third ...)

	m.2	M.2	m.3	M.3	4	Trit.	5	m.6	M.6	m.7	M.7	8
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

2. (a) You are going to hear 5 triads; Indicate the type of each triad.
   (b) You are going to hear 5 major and minor triads; Indicate the position of each triad, i.e. inversion.

(a)	Maj.	Min.	Dim.	Aug.
1				
2				
3				
4				
5				

(b)	Root	First	Second
1			
2			
3			
4			
5			

11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

3. You are going to hear 5 dominant seventh chords; Indicate all the inversions.

	Root	First	Second	Third
1				
2				
3				
4				
5				

21	
22	
23	
24	
25	

Sub Total

---

3 The entrance test for prospective instrumental teachers (ML) requires the same aural skills, but the music examples are easier.

Transferred Sub Total

4. You are going to hear an accompanied melody of which the rhythm has been given below; Add the pitches.

26	27	28	29	30	31	32	33

26	
27	
28	
29	
30	
31	
32	
33	

5. You are going to hear a musical phrase consisting of eight measures; Indicate the harmonic function that applies for each measure. M = Measure.

	M. 1	M. 2	M. 3	M. 4	M. 5	M. 6	M. 7	M. 8
DD(V/V)								
D (V)								
T (I)								
S (IV)								
	34	35	36	37	38	39	40	41

34	
35	
36	
37	
38	
39	
40	
41	

6. You are going to hear an accompanied melody of which the pitches are given below; Add the rhythms.

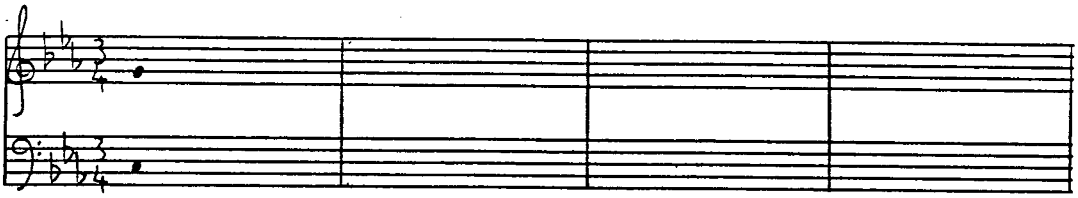
42	43	44	45	46	47	48	49

42	
43	
44	
45	
46	
47	
48	
49	

Sub Total

Transferred sub total

7. You are going to hear a short two-part excerpt; notate the upper and lower voices.



50	51	52	53
54	55	56	57

50	
51	
52	
53	
54	
55	
56	
57	

8. You are going to hear a four-part choral-style phrase ("Kantionalsatz"); Name the triads with a capital letter for major and a small letter for minor. The initial key is given.

a							

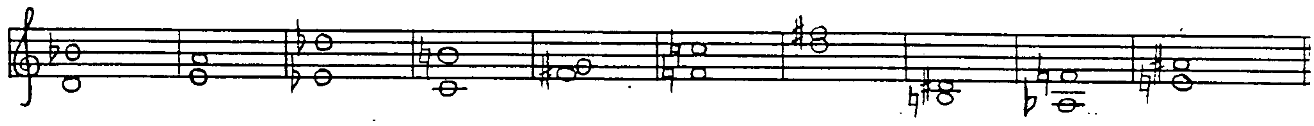
	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72

58	
59	
60	
61	
62	
63	
64	
65	
66	
67	
68	
69	
70	
71	
72	

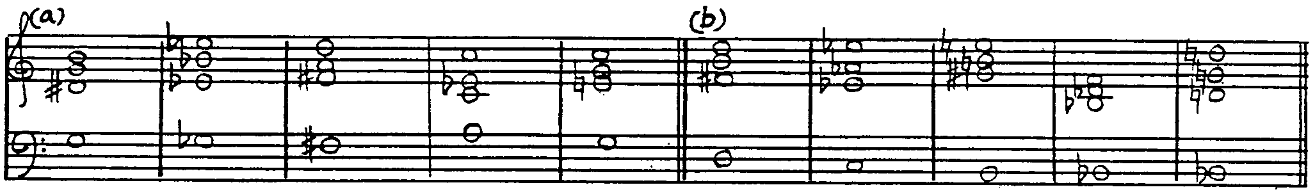
Total

Answers of questions One to Eight

Question one

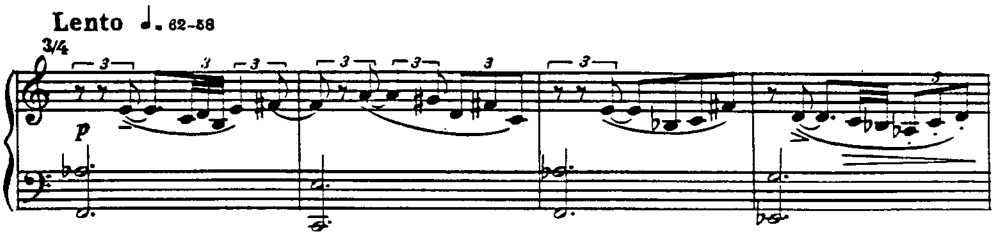


Question two

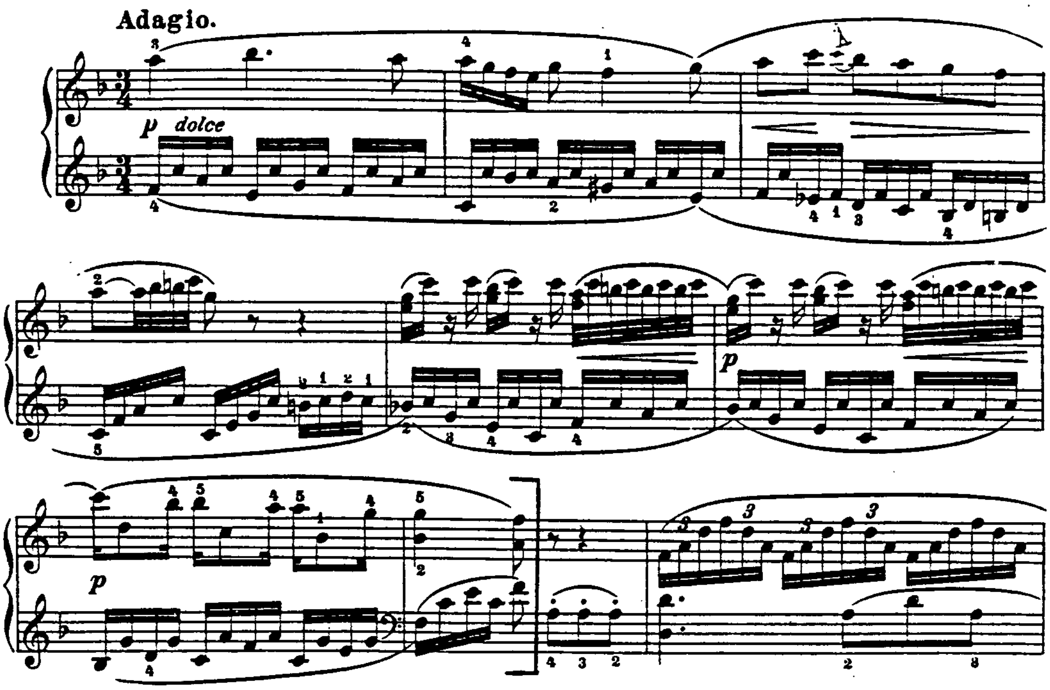


Question three

Question four: Excerpt from *Sketches Op. 9b (III)* by Béla Bartók:

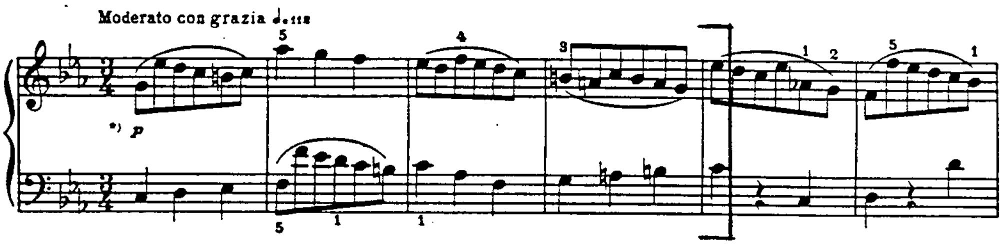


Question five: Excerpt from *Sonatina in C major, Adagio* by Ludwig van Beethoven:



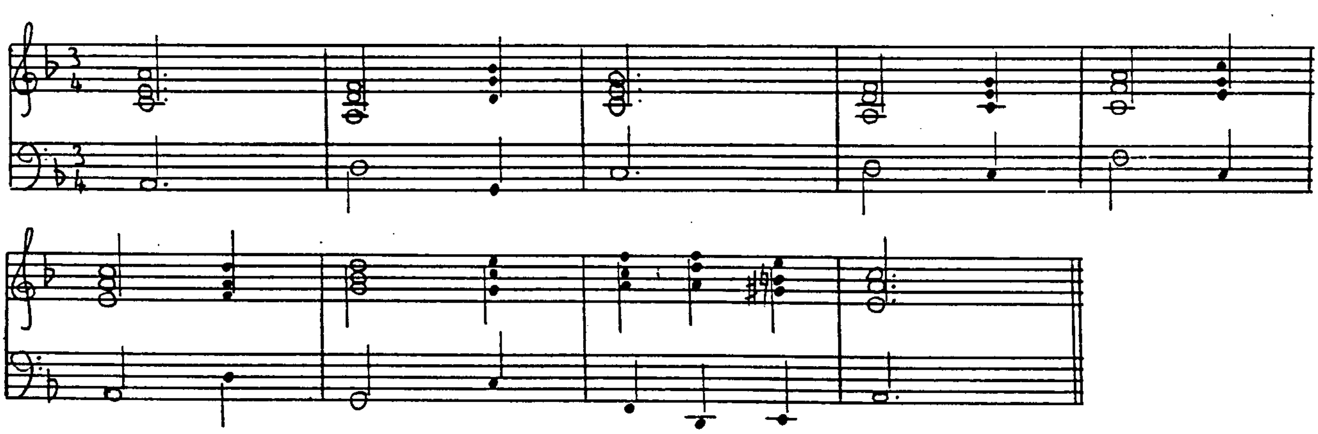
Question six: Excerpt from the *Sonata in D major Hoboken XVI/42* by Joseph Haydn:

Question seven: Excerpt from the *French Suite II (Menuet)* by Johann Sebastian Bach:



Question eight: Based upon an excerpt of the choral-style part ("Kantionalsatz") in the *Trois Nocturnes Op. 15/3* by Frédéric Chopin:

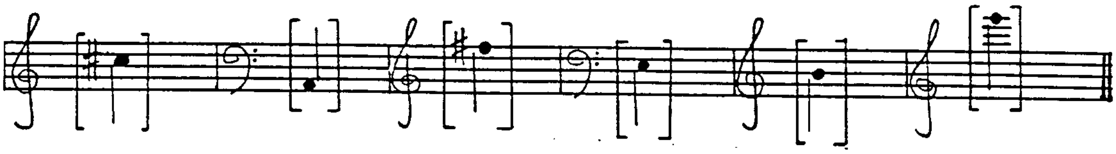
a	(d)	(g)	(C)	(d)	(C)	(F)	(C)
(a)	(d)	(g)	(C)	(F)	(d)	(E)	(a)



B: Staatliche Hochschule für Musik und Darstellende Kunst Stuttgart

1. Entrance test in Aural Training for all prospective students

1.1 Notate the following six tones that are played in the key of D major. The precise octave in which the tones appear will not be evaluated:



1.2 Notate the following three interval groups that are played:

1.3 Name the six intervals, e.g. major third.(Each interval is played harmonically.)

(a)............................ (b)............................
(c)............................ (d)............................
(e)............................ (f)............................

1.4 Eight chords are played. Name the type and inversion of each chord. The following types appear:

Major	(M)
Minor	(m)
Augmented	(Aug.)
Dominant seventh	(D^7)
Diminished	(Dim.)

You may use the symbols that you are familiar with, or use the following:

Maj.	Maj.	Maj.	Min.	Min.	Min.	Aug.	D^7	D^7	D^7	D	D^V or	V^7	V^6_5	V^4_3	V^2	VII^7
	3	5		3	5			3	5	7						

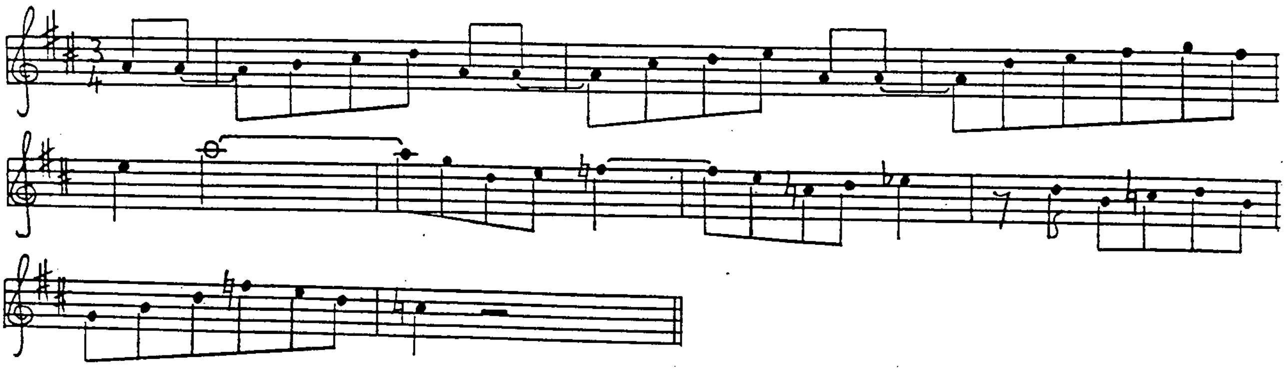
No indication of the inversions of the augmented and diminished chords is necessary.

(a)...................... (b)...................... (c)...................... (d)......................
(e)...................... (f)...................... (g)...................... (h)......................

Chords played:

1.5 Cadence hearing: Two pauses will be made in a piece of music (e.g. a Schubert Waltz). Indicate in each case the function of the last chord where the piece was interrupted. Only T, S, D, (I, IV, V) appear.

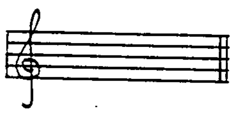
1.6 Dictation



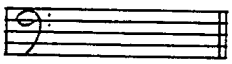
2. Elementary theory test

All Aural Training students have to take a test in elementary theory apart from the other more difficult written theory test.

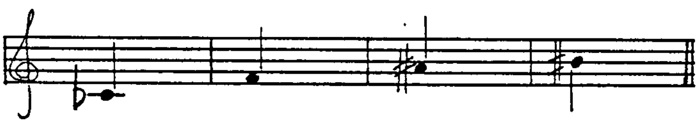
2.1 Write the following notes: (a) E sharp$^{///}$



(b) contra B flat



2.2 Write the required intervals downwards:



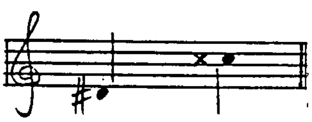
Min. 7th Aug. 4th Maj. 6th Perf. 4th

2.3 Name the following intervals:

(a)

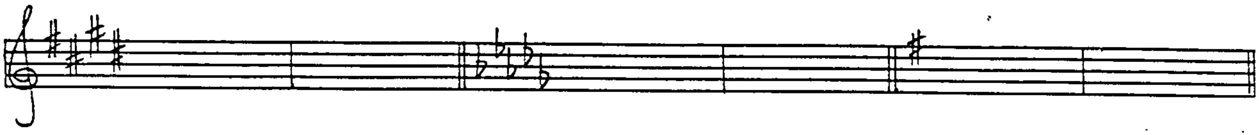
....

(b)



....

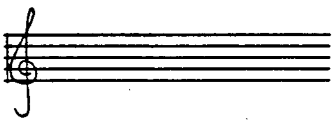
2.4 Write the required steps in the minor keys indicated by the key signatures:



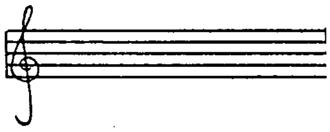
Harm. min. 2 7 Mel. Min. 6 3 Mel. min. 7 6

2.5 (a) What is the relative major key of b flat minor? ....
(b) Name the Subdominant chord in f minor. .... (In note names)

2.6 (a) Write the first inversion of a f sharp minor triad:



(b) Write a diminished triad on a sharp:



(c) Name 1.) the chord type and 2.) the inversion of the given chord

1.) ....
2.) ....

3. Requirements for the final Aural Examination

The requirements for the various final examinations in Aural Training were published in the following small booklet. This was not translated into English because examples of the examinations appear in sections four to seven.

STAATLICHE HOCHSCHULE FÜR MUSIK
UND DARSTELLENDE KUNST STUTTGART

Die Abschlußprüfung in Gehörbildung

Wer sich auf die Abschlußprüfung in Gehörbildung vorbereitet, sollte wissen, welchen Sinn für seine Qualifikation als Berufsmusiker die in diesem Fach geforderten Leistungen haben. Die vorliegende Zusammenstellung möchte darüber informieren.

Zur Qualifikation eines Berufsmusikers gehört unter anderen Fähigkeiten auch die, Strukturen gehörter und selbst produzierter Musik zu erkennen, zu benennen und mit ihnen umzugehen.

Keine Prüfung kann den Erkenntnisstand des Bewußtseins direkt messen. Man braucht das nachgespielte Thema, die schriftlich oder verbal aufgezählten Begriffe, die gesungenen oder notierten Beispiele, um aus deren optischer oder akustischer Wahrnehmung zu erschließen, ob der Proband weiß, "was das ist", das in seinem Inneren klingt. Das eigentliche Ziel gehörbildnerischer Tätigkeit sind diese Beispiele nie.

Alle Bildungs- und Prüfungsmethoden des Gehörs sind Arten von Information über Klangvorstellungen, und der Wert dieser Methoden kann nur von dieser Definition her zutreffend beurteilt werden.

Im Folgenden wird für jeden Prüfungsteil aufgeführt, wie die Prüfungsbeispiele ausgewählt sind und in welcher Weise sie diktiert werden. Hinweise über die Intention jedes Prüfungsteils schließen sich an. Die Tabellen zur Bewertung der Leistungen sind auf S. 8 zusammengefaßt.

Hubert Haas

Oktober 1985

I. SCHRIFTLICHE PRÜFUNG

1.) Einstimmige Nachschrift:

Tonal nicht gebundene Melodien des 20. Jhdts.
Das Beispiel erklingt in musikalisch angemessenem Tempo und wird dann in Abschnitten wiederholt. Zum Schluß erklingt das ganze Beispiel noch zweimal.
Als Fehler zählen falsche Intervalle und falsche Dauern. Weniger streng können falsche Intervalle gewertet werden, die nach einem vorausgehenden Fehler wieder zur richtigen Tonhöhe zurückführen. Dasselbe gilt für die analoge Wiederholung falscher Dauern.

Das Ergebnis weist nach, wieweit der Bewerber die melodischen und formalen Strukturen des Beispiels, wie Sequenzen oder latente Melodik, wahrnehmen kann. Spontane Wahrnehmung der Intervalle und deren rasche Übertragung in das Tonsystem sind dazu Voraussetzung.

2.) Zweistimmige Nachschrift:

Instrumentalmusik, ungefähr 16 Takte, des 17. und 18. Jhdts.
Vorgegeben werden Tonart und Taktart. Das Stück erklingt in musikalisch angemessenem Tempo und wird dann in Abschnitten wiederholt.
Zum Schluß erklingt das ganze Beispiel noch zweimal.
Wiederholungsfehler werden - sofern es sich um identische Tonhöhen handelt, beim ersten Auftreten ganz, in den folgenden Fällen nur halb berechnet.

Steht eine Phase in einer falschen Tonart, ist jedoch in sich richtig, so wird deren Eingang und Ausgang als je ein Fehler gerechnet.

Das Ergebnis weist nach, wieweit ein Bewerber die linearen und harmonischen formalen Strukturen des Beispiels wahrnehmen und deuten kann.

3.) Vierstimmig

a) Nachschrift:

Ein vierstimmiger Satz mit Modulation oder Ausweichung.
Vorgegeben werden Tonart und Taktart. Das Stück erklingt zweimal ganz. Dann wird jeder Stollen zweimal gespielt, dann wieder zweimal das Ganze.

Wir verlangen die Nachschrift der Außenstimmen zusammen mit der Generalbaßbezifferung. Der harmonische Verlauf muß durch Baß und Bezifferung eindeutig definiert sein. Bewegungen, die harmonisch undefinierbare Zusammenklänge herbeiführen, können ohne Bezifferung bleiben.

Das Ergebnis weist nach, wieweit ein Bewerber gängige harmonische Verläufe durchhören und wiedergeben kann. Dabei ergänzen und bestätigen sich intervallisches, tonal lineares und harmonisches Hören.

Für diese drei Diktate steht eine Stunde zur Verfügung.
Den Bewerbern aus den Abteilungen SM, KM und ML mit zusätzl. HF Musiktheorie/Gehörbildung werden Beispiele mit erhöhten Anforderungen vorgelegt.

b) Veränderungen hören:

Ein vierstimmiger Satz mit Modulation oder Ausweichung

Nur für Bewerber aus den Abteilungen SM, KM und ML mit zusätzl. HF Musiktheorie und Gehörbildung.

Der Satz liegt dem Bewerber in Noten vor. Er wird zweimal abschnittweise mit Veränderungen gespielt. Danach erklingt das veränderte Beispiel nochmal ganz.
Der Bewerber trägt die Veränderungen in seine Vorlage ein.

Ist die Eintragung harmonisch falsch, so wird eine Viertelnote abgezogen, fehlt die Eintragung ganz, eine halbe Note. Steht eine Eintragung an einer gar nicht veränderten Stelle, so werden drei Viertel abgezogen.

Das Ergebnis weist nach, ob die Klangvorstellung, die der Bewerber mit dem Schriftbild verbindet, so klar ist, daß eine Diskrepanz zum gerade gehörten Klang bewußt wird.

Für diesen Prüfungsteil stehen 15 Minuten zur Verfügung.

Verrechnung der Noten

Für die obengenannten Bewerber: $\frac{3a) + 3b)}{2} = 3.)$

Für alle Bewerber: $\frac{1.) + 2.) + 3.)}{3}$ = Endnote der schriftlichen Prüfung. (I)

Dieses Ergebnis wird weder auf- noch abgerundet.

II. Mündliche Prüfung

1.) Einzeltöne

a) S t u f e n einer Molltonart mit 2 - 4 Vorzeichen
- Die Tonart wird gegeben.
- Nach jedem falsch benannten Ton wird die Tonart neu gegeben.
- Die Töne sind verteilt zwischen Kontra G und c'''.
- Jeder Ton wird nur einmal gegeben.
- Die Töne sind mit Tonnamen zu benennen.

b) I n t e r v a l l e , tonal nicht gebunden
Bewerber aus den Abteilungen KA, ML, OR und KMB benennen die Töne einer festgelegten Intervallfolge jeweils unmittelbar nach dem Anschlag.

Bewerber aus den Abteilungen SM, KMA und ML mit zusätzl. HF Musiktheorie und Gehörbildung benennen die festgelegte Intervallfolge in Gruppen zu vier Tönen, also drei Intervalle aus dem Gedächtnis. Der Anfangston jeder der vier Gruppen wird angegeben.

Das Ergebnis weist nach, wieweit der Bewerber sich im Tonsystem nach Tonarten und Intervallen orientieren kann.

2.) Vom Blatt singen:

a) Solo-Gesangsstimme mit Chromatik und Modulation für ML, OR, KA, KMB.
b) Ein Beispiel mit tonal nicht gebundenen Teilen für SM, KMA, ML mit zusätzl. HF Musiktheorie und Gehörbildung (ZHMG).
c) Bewerber mit Hauptfach Gesang (ML) können zwei Beispiele (a) und (b) vom Blatt singen und bekommen dafür zum Ausgleich ein leichteres Beispiel unter II/4.

Der Bewerber bekommt Zeit, um sich zu orientieren und das Tempo zu wählen. Dann wird der Anfangston angeschlagen.
Rhythmische Veränderungen werden als Fehler gezählt, ohne daß der Prüfer eingreift, falsche Tonhöhen jedoch werden sofort am Klavier berichtigt. Bei extrem langsamem Tempo muß bis zu einer Note abgezogen werden.

Das Ergebnis weist nach, wieweit ein einstimmiger Notentext beim Bewerber eine Klangvorstellung hervorruft und ob diese so klar ist, daß die Einzeltöne zu einer musikalischen Gestalt werden. Auch darf als Grundfähigkeit eines musikalischen Fachmanns angesehen werden, daß er singend eine Klangvorstellung zitieren kann.

3.) Nachspielen einstimmig:

Melodie eines Themas. Sie soll in Vordersatz und Nachsatz gegliedert sein und kann Chromatik, eine Ausweichung oder eine Modulation enthalten.

Der Bewerber hört zuerst das Thema ganz, dann zweimal den Vordersatz. Danach soll er den Vordersatz nachspielen. Er hört dann zweimal den Nachsatz und spielt diesen nach. Im zweiten Durchgang hört er nochmal das Ganze und spielt es ohne Unterbrechung nach.

Wir bewerten Fehler im ersten Durchgang wesentlich geringer als im zweiten. In der Tabelle auf S. 8 ist zu sehen, wieviel von Note 1 nach jedem Halbsatz aufgrund von Fehlern abgezogen wird. Wir geben also insgesamt vier Einzelwertungen, in jedem Durchgang zwei.

Das Ergebnis weist eine Gedächtnisleistung nach. Diese ist nur möglich, wenn der Bewerber die Struktur der Melodie erkennen und für sich benennen kann.

4.) Nachspielen, harmonisch:

Eine Periode im vierstimmigen Satz.
Ein Literaturbeispiel für SM, KMA, ML mit zusätzl. HF Musiktheorie und Gehörbildung (ZHMG).
Ein leichteres Literaturbeispiel für KMB und ML Hauptfach Klavier/Orgel/Cembalo.
Ein Obungsbeispiel in moll mit D^7, D^V, (D), S^{6}_{5} und/oder ähnl., für OR, KA und ML, Hauptfach Melodieinstrument oder Gesang.

Prüfungsmodus: siehe 3.), Nachspielen einstimmig

Das Ergebnis weist eine Gedächtnisleistung nach. Diese ist nur möglich, wenn der Bewerber die melodischen und harmonischen Strukturen des Beispiels erkennen und benennen kann.

5.) Akkorde einzeln benennen:

Aus Literatur ausgesuchte Folgen von 12 Harmonien.

Jeder Akkord wird zweimal gegeben.
Der Klang kann in drei Denk-Schritten definiert werden:

1) Melodieton oder Baßton, aus der linearen Fortschreitung hergeleitet.
   Die Bestätigung oder sofortige Korrektur seiner Antwort benützt der Bewerber für die weiteren Schritte:
2) Die Art des Klangs zusammen mit der Tonart,
3) Die Umkehrung des Akkordes und die noch fehlende Außenstimme.
   Nach einem Fehler im 2. oder 3. Schritt gibt der Prüfer sofort die ganze Lösung an und geht zum nächsten Akkord weiter.

Sinn der Prüfung:

Das Ergebnis weist nach, wieweit der Bewerber harmonische Klangvorstellungen identifizieren kann.

Für die mündliche Prüfung sind pro Bewerber 25 Minuten vorgesehen. Der Prüfer muß die Oberlegungspausen entsprechend begrenzen.

Verrechnung:

$$\frac{1. + 2. + 3. + 4. + 5.}{5} = \text{Endnote der mündlichen Prüfung (wird weder auf- noch abgerundet)}$$

$$\frac{\text{Schriftlich + Mündlich}}{2} = \text{Endnote in Gehörbildung}$$

Dieses Ergebnis wird auf ganze Noten auf- oder abgerundet.

BEWERTUNGSTABELLEN FÜR GEHÖRPRÜFUNGEN (ABSCHLUSS)

1. Schriftlich: 1-stimmig, 4-stimmig I/1, I/3
   Mündlich: Akkorde, Blattsingen II/5, II/2

Fehler:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Note:	1	1,33	1,66	2	2,33	2,66	3	3,2	3,4	3,6	3,8	4	4,2	4,4	4,6	4,8	5

2. Schriftlich: 2-stimmig I/2
   Mündlich: 24 Einzeltöne II/1

Fehler:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Note:	1	1,25	1,5	1,75	2	2,25	2,5	2,75	3	3,16	3,33	3,5	3,67	3,84	4	4,16	4,33	4,5	4,67	4,84	5

3. Mündlich: Thema, Kadenz
   II/3, II/4

	1. Durchgang		2. Durchgang	
	Vorders.	Nachsatz	Vorders.	Nachsatz
Stottern	1/4	1/4	1/2	1/2
Fehler	1/4	1/4	1/2	1/2
Stottern u. Fehler	1/2	1/2	1	1
Schwere Fehler und Versagen	1/2	1/2	1 1/2	1 1/2

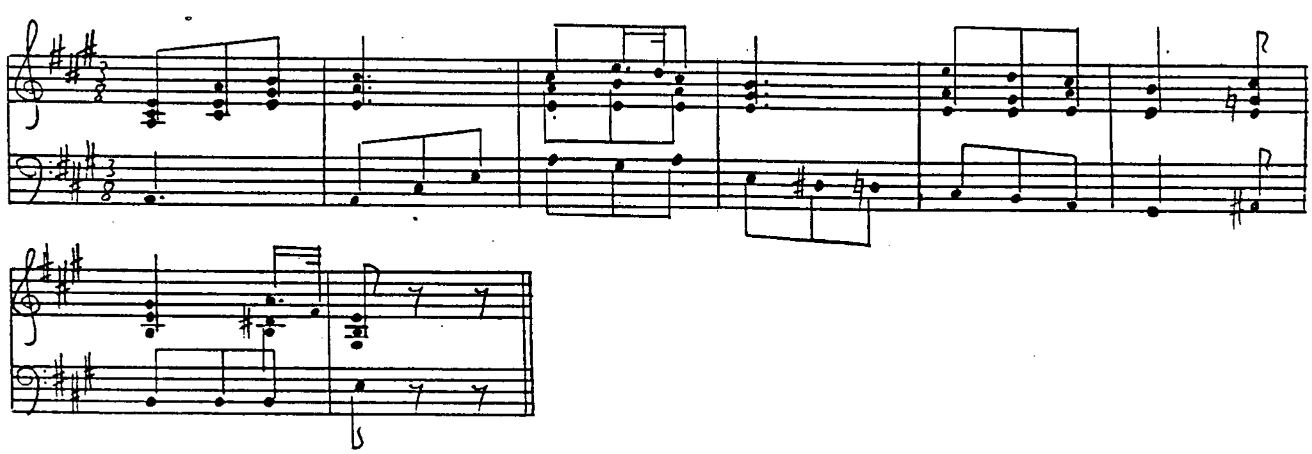
4. Example of the oral part of the final Aural examination for school music teachers (SM)

4.1 Notate the played notes according to the given scale.

4.2 Name the interval groups using note names.

4.3 Repeat a heard melody on the piano: Excerpt from *Der Scholar* by Hugo Wolf.

4.4 Repeat a heard "cadence" on the piano: Excerpt from the *Second Symphony, II Op. 36* by Ludwig van Beethoven.



4.5 Sight Singing: Excerpt from a composition by Ernst Pepping (Exact details unkown.)

4.6 Free harmonic phrase: each chord has to be named, e.g. c minor root position. Chords are taken from *Zwölf geistliche Lieder* by Max Reger Op. 137 nr. 2.

5. Example of the written part of the final Aural examination for school music teachers (SM)

5.1 One-part dictation: Excerpt from *Schulwerk für Instrumental-Zusammenspiel Op. 44 nr. 2* by Paul Hindemith

5.2 Two-part dictation: *Menuett* by Anton Franz Maichelbeck

5.3 Four-part dictation: Choral BWV 153/9 *Ach Gott, wie manches Herzeleid* by Johann Sebastian Bach.

5.4 Error detection: *Jesu meiner Seelen Wonne* (Nr. 350) from the 371 Choral hymns by Johann Sebastian Bach.

6. Example of the oral part of the final Aural examination for instrumental teachers (ML), orchestra musicians (OR) and church musicians /cantors B (KM B)[4]

6.1 Notate the played notes according to the given scale.
(No example is given because it is the same as for SM)

6.2 The following played intervals should be named using note names. (The name of the first note is given. Each note is played only once and sustained for a while.)

6.3 Repeat a heard melody on the piano: Excerpt from *Die Krähe (Winterreise Op. 89)* by Franz Schubert.

6.4 Repeat a heard "cadence" on the piano: Excerpt from the *Wanderer-Fantasie Op. 15* by Franz Schubert.

6.5 Sight Singing: Excerpt from a Baroque aria with chromatic changes. (Exact details unknown.)

4 Passing the KM B examination in church music is required before starting the KM A course which is more difficult.

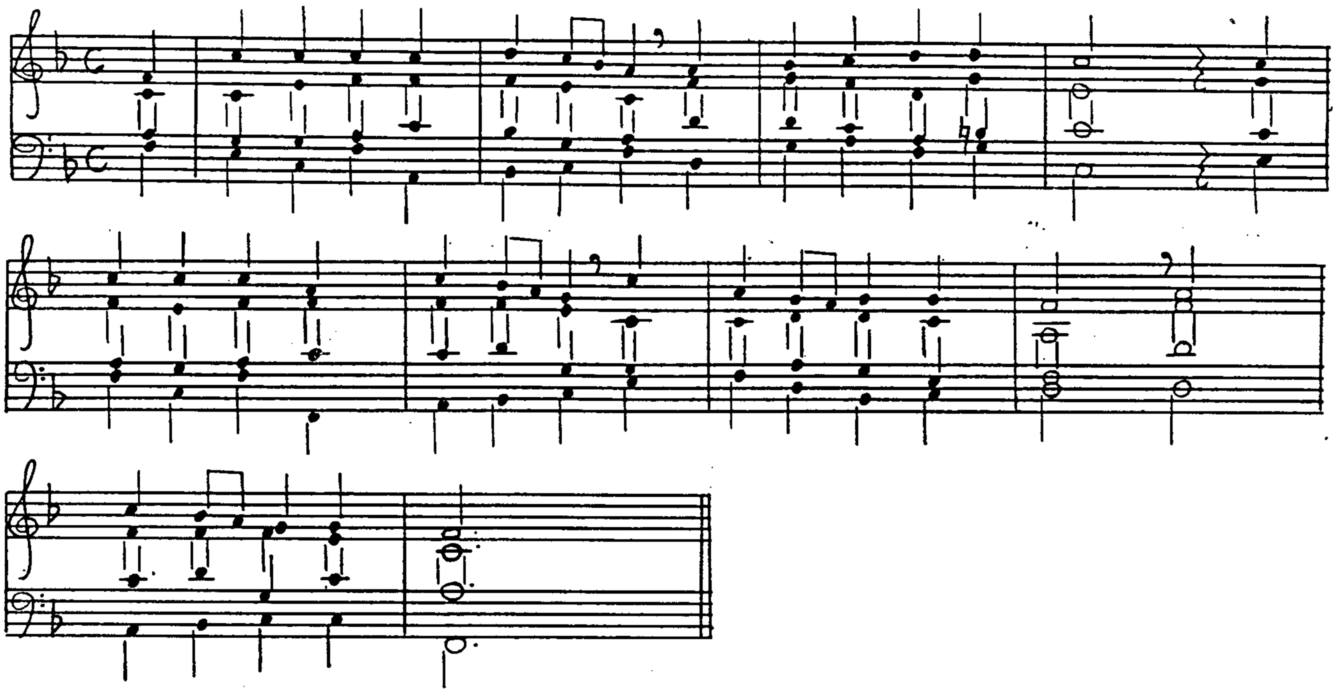
6.6 Free harmonic phrase: each chord has to be named, e.g. c minor root position. Chords are taken from *Zwölf geistliche Lieder* by Max Reger Op. 137 nr. 1.

7. Example of the written part of the final Aural examination for instrumental teachers (ML), orchestra musicians (OR) and church musicians /cantors B (KM B)

7.1 One-part dictation: Excerpt from the *Serenade für Flöte, Oboe und Fagott* by Wolfgang Fortner

7.2 Two-part dictation: *Menuet* (shortened) by Johann Casper Ferdinand Fischer

7.3 Four-part dictation: Choral *Lobt Gott ihr Christen* from the *Neues Choralbuch* Nr. 167.



THE UNITED STATES OF AMERICA

A. The University of Rochester, Eastman School of Music

Example of the Sight Singing entrance examination for prospective music students[5]

Students have to sing so-called first, second or third year "placement" melodies in order for the examiners to determine their achievement level.

AURAL SKILLS DIAGNOSTIC

To be completed by all students:

Name:______________________________ Major: ____________________

Instrument:______________________________ Perfect Pitch? Yes____ No____ Maybe____

Status:____Entering freshman ________Completing TH 151-152 at ESM

____ Entering transfer

To be completed by entering students only:

Years of sight singing training (if any): ________

Years of keyboard study (if any): ________

I. Sight Singing Rate from 1 to 5, with 5 the highest score--circle rating: [NOTE: N/A means "not attempted"--would be too difficult based on performance of previous melodies.]

First year melodies:						
#1 - C Major	N/A	1	2	3	4	5
#2 - G Minor (transposed, if perfect pitch)	N/A	1	2	3	4	5
Second year melodies:						
#1 - G Minor	N/A	1	2	3	4	5
Third year melodies:						
#3 - nontonal	N/A	1	2	3	4	5

Sight singing placement for incoming students: (circle one)	TH 131 1st yr	TH 131(I) 1st yr. remedial	TH 141 2nd yr	TH151 3rd yr

II. Keyboard

1.	Bass clef melody (left hand)	N/A	1	2	3	4	5
2.	Treble clef melody (right hand	N/A	1	2	3	4	5
3.	Chorale (hands together)	N/A	1	2	3	4	5
4.	Keyboard texture (hands together)	N/A	1	2	3	4	5

Keyboard placement: Remedial program (TH 70-71) Yes____ No____

Comments:____

____

Interviewer:________________________

5 Copies of other "diagnostic" examinations such as Dictation could not be located. According to one of the teaching assistants, no final comprehensive examination existed. Students were however expected to have mastered the following skills (amongst others) at the end of the third and final year of study:

- Conducting, singing and taking dictation of complex and mixed meters, metric modulation
- Dictation of twelve-tone rows and recognition of transformations in both p- and pc-space (Pitch class theories are applied to Aural Training at this school)
- Singing of unaccompanied prepared songs by Berg, Webern, Crumb, Dallapiccola and others
- Aural recognition of basic sets (trichords and all-combinational hexachords).

RATING SCALE FOR AURAL SKILLS DIAGNOSTIC

Students may sing on "la" or numbers or solfege -- whatever makes them feel most comfortable. They may choose to conduct, or tap the beat, or count internally. They should be encouraged to look over the melody before beginning, to set a moderate tempo that they can keep consistently, and to avoid stopping or starting over. Play I-V-I in the tonality before asking the student to sing. Do not play the first pitch (this should be deduced from the tonal framework).

Perfect pitch students should be asked to sing the second first-year melody in a key other than notated, while thinking carefully about function: possibly E-flat minor instead of G minor. Do not force them to sing the chromatic or nontonal melody in a key other than notated.

Rating of 5:
Excellent. Has 0-1 errors of pitch or rhythm. No stopping or starting over. Tempo may be slow, but must be steady.

Rating of 4:
Good. May have 2 errors of pitch or rhythm. May include some hesitation, but stopping or starting over counts as an error. Problematic intonation counts as one error (do not tally multiple errors for each note out of tune).

Rating of 3:
Medium; 3-4 errors of pitch or rhythm, but no loss of tonic. Student may be given a second chance to correct the mistakes, counting this second chance like a "start over." If the student can now sing the melody with no errors, he/she should be given a rating of "4"; if any problems at all still persist, a rating of "3" should be given.

Rating of 2:
Poor. More than 4 errors. Student may loose tonic in the context of the melody, but is able to supply it "on demand." Student tries to start over many times. Eventually gets through the melody, but only with help from the instructor or multiple attempts at each problem point.

Rating of 1:
Unacceptable. May include any of the following: student loses tonic and cannot supply the tonic pitch "on demand," more pitch and rhythm errors than can be counted, student cannot complete the melody at all.

N/A - "Not attempted":
This rating should be used in instances where the performance was so unacceptable at one level, and showed so little mastery of the material, that it seemed pointless to progress to a more challenging level.

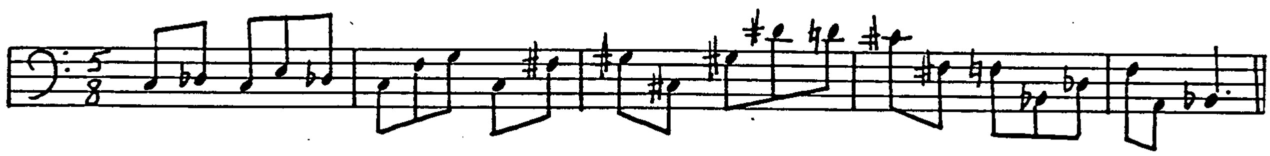
STUDENTS MAY NOT EXEMPT A LEVEL OF SIGHT SINGING UNLESS THEY RATE A 5 ON ONE MELODY AT THAT LEVEL, AND A 4 OR 5 ON A SECOND MELODY AT THAT LEVEL.

Sight Singing Placement

First year

Second year

Third year



B: Results from the Institute for Music Theory Pedagogy Studies II[6]

At the *Second Institute for Music Theory Pedagogy Studies* conference held in 1989 in Boulder, Colorado, participants took part in a questionnaire-based survey on selected aspects of Aural Training and Music Theory. The following three questions were included on final examination requirements:

Question three: At the end of the theory sequence in sightsinging, students are expected to:

(a) sing at sight a melody which modulates to a common related key (62%)
(b) sing at sight a melody which contains much chromaticism (53%)
(c) sing at sight a melody which has no tonal center (18%)
(d) sing melodies in four clefs (24%)

Question four: At the end the theory sequence in ear training, students are expected to:

(a) write a two phrase melody containing chromaticism (50%)
(b) identify phrase relationships (53%)
(c) write two or more parts of a four-part chorale-style phrase which includes only diatonic harmony (33%)
(d) write two of more parts of a four-part chorale-style phrase which includes some chromatic harmony or modulation (73%)
(e) write a transcription from a recording (8%)

Question five: Do you have a written policy at your school as to exit requirements in theory?

(a) Yes (24%)
(b) No (76%)

6 Roger E. Foltz and Alice M. Lanning, "Report on the Institute for Music Theory Pedagogy Studies II" in **Journal of Music Theory Pedagogy**, 3/2 (Fall 1989) p. 246.

APPENDIX K

AURAL TRAINING "TRIAL" LESSON AT THE HOCHSCHULE DER KÜNSTE BERLIN

Students taking Aural Training as a second major subject had to give trial lessons to junior students. The concept of the lesson was described as follows by the lecturing student:

1. Musical subject:

Etude Nr. VI from *Estudios Sencillos* by Leo Brouwer

2. Objectives, arranged progressively

2.1 Determine the form.
2.2 Name the criteria that determine the form.
2.3 Recognize the direction of movement of the melodic progression.
2.4 Simple characterizations of the intervals, e.g. "open" sound at the beginning (perfect fourth), "in-itself-resting" end sound (major ninth).
2.5 Recognition of musical-rhetorical figures: Lamento bass, pedal point (Palillogia) as reaction against the Redicta prohibition.
2.6 Determination of the non-harmonic tones and their modes.
2.7 Recognition of the ambivalence of these tones, e.g. their tonal harmonic and melodic characteristics.

3. Indications as to what to listen for (Aural Analysis), as well as assignments given

3.1 The same voices are located at the same metric places in the broken chord.
3.2 Determine the progression in the individual voices.
3.3 Be ware of similarities, e.g. the sounding of the Lamento figure in various voices.
3.4 Determine the non-harmonic foreign tones that fit into the major/minor key systems.
3.5 Consider in which the church modes these tones can possibly occur.
3.6 Determine which modes are included in which measure. Do the tones sounding have a Tonic/Subdominant/Dominant effect?
3.7. Play a major triad on the piano with one or more extra tones added (all tones should be played together). Try to hear the extra tone(s) mentally, e.g. lydian fourth, phrygian second. Sing this tone(s) (without humming it first) and check the result by sustaining this tone and by releasing the other tones of the triad.
Repeat this exercise with a minor triad.
Play only the triad and sing an additional non-harmonic tone. Check the result by playing this sung tone.
Repeat this exercise with a minor triad.
The most important requirement is a well-tuned piano!