

THE VALIDITY ENDEAVOUR

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DECLARATION

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Abstract

Qualitative and quantitative research implies different meta-theoretical approaches to knowledge production. The former maintains a constructivist and interpretative perspective, as opposed to the latter, which exists within a realist and even positivist paradigm. Within the field of research methodology, the dominant conceptualisation of validity is based on a positivist discourse, which suggests that (social) scientific research should strive to attain an ultimate truth. This understanding of validity is difficult to achieve within a research paradigm that values the idiosyncratic world views of the participants under investigation. The introduction of CAQDAS (Computer Assisted Qualitative Data Analysis Software), however, brought with it the hope that its application would confer upon qualitative research the rigour associated with validity in a mainly positivist interpretation of the research process.

The ultimate goal of this thesis is to determine whether CAQDAS can make a significant contribution to efforts aimed at validating qualitative research. The research design employed in the present study is that of a descriptive content analysis, focussing on scientific articles that not only report qualitative studies, but also make explicit reference to the use of CAQDAS, and describe validation techniques applied during the research process. Purposive sampling was applied to select 108 articles, published from 1996 to 2009, that meet the sampling criteria and that were identified through online searches of various bibliographic databases and search engines.

The study investigates three predominant research questions concerned with the following: (1) the most commonly used software programmes; (2) trends in CAQDAS use over time; as well as (3) the validation techniques reported in examined scientific articles, distinguishing between techniques that are performed with and without the use of CAQDAS.

With regard to the first two research questions, it was found that the three most commonly used software programmes are QSR N programmes (including NUD.IST, NVivo, N4, N5 and N6), followed by Atlas.ti and MAXqda (including the earlier version winMAX), and that there has been a general increase over

the past 13 years (1996-2009) in the number of qualitative research articles reporting CAQDAS use.

The exploration of validation techniques utilised in qualitative research, as reported in the examined scientific articles, demonstrated that the techniques are in most cases performed manually. Although CAQDAS offers many benefits, the predominant validation techniques reported can be, and still are, performed without CAQDAS. Techniques that would have been impossible without CAQDAS are based on the data display features of CAQDAS, as well as on the accuracy and consistency offered by CAQDAS in the execution of certain actions. The findings generated by this study seem to support the hypothesis that CAQDAS *per se* does not enhance validity, since it is predominantly utilised as merely a research tool.

Opsomming

Kwalitatiewe en kwantitatiewe navorsing is gegrond op verskillende meta-teoretiese benaderings tot die lewering van inligting. Eersgenoemde handhaaf 'n konstruktivistiese en interpretatiewe perspektief, teenoor laasgenoemde, wat binne 'n paradigma bestaan wat gegrond is op realisme en positivisme. Binne die veld van navorsingsmetodologie, is die oorwegende konseptualisering van geldigheid, gebaseer op 'n positivistiese diskoers, wat voorstel dat (sosiale) wetenskaplike navorsing daarna moet streef om 'n absolute waarheid te bereik. Hierdie begrip van geldigheid word moeilik verwesenlik binne 'n navorsingsparadigma wat waarde heg aan die ideosinkratiese wêreldbeskouinge van die navorsingsdeelnemers. *CAQDAS (Computer Assisted Qualitative Data Analysis Software)*, is bekend gestel met die hoop dat die gebruik daarvan kwalitatiewe navorsing sal verleen met stiptheid wat met geldigheid geassosieer word, oorwegend binne 'n positivistiese interpretasie van die navorsingsproses.

Die oorkoepelende doelwit van hierdie tesis is om vas te stel of *CAQDAS* enige betekenisvolle bydrae kan maak tot pogings om die geldigheid van kwalitatiewe navorsing te verbeter. Die navorsingsontwerp van die huidige studie is die van 'n beskrywende inhoudsanalise, wat fokus op wetenskaplike artikels wat nie net berig oor kwalitatiewe studies nie, maar ook verwys na die gebruik van *CAQDAS*, en die geldigheidstegnieke wat tydens die navorsingsproses toegepas is, bespreek. Doelgerigte steekproeftrekking is toegepas en 108 artikels, wat gepubliseer is vanaf 1996-2009, was geselekteer op grond van die feit dat hulle aan die seleksie kriteria voldoen. Die artikels was geïdentifiseer deur aanlyn soektogte van verskeie bibliografiese databasisse en soekenjins.

Die studie ondersoek drie oorwegende navorsingsvrae met betrekking tot die volgende: (1) die sagteware programme wat die meeste gebruik word; (2) neigings in die gebruik van *CAQDAS* oor verloop van 'n tydperk; sowel as (3) die geldigheidstegnieke wat in die ondersoekte wetenskaplike artikels

gerapporteer word, deur onderskeid te tref tussen tegnieke wat met of sonder die gebruik van *CAQDAS* uitgevoer word.

Met verwysing na die eerste twee navorsingsvrae, was dit gevind dat die drie algemeenste sagteware programme wat gebruik is, QSR N programme (insluitend NUD.IST, NVivo, N4, N5 en N6), gevolg deur Atlas.ti en MAXqda (insluitend die vroëere weergawe winMAX) is, en dat daar oor die algemeen 'n toename is in die getal kwalitatiewe navorsingsartikels oor die afgelope 13 jaar (1996-2009), wat die gebruik van *CAQDAS* rapporteer.

Die ondersoek na geldigheidstegnieke wat in kwalitatiewe navorsing gebruik word, soos berig in die ondersoekte wetenskaplike artikels, het getoon dat die tegnieke in die meeste gevalle sonder die gebruik van *CAQDAS* uitgevoer is. Ten spyte van die feit dat die gebruik van *CAQDAS* voordele inhou, word die meerderheid geldigheidstegnieke wat gerapporteer word, steeds sonder die gebruik van *CAQDAS* uitgevoer. Tegnieke wat nie sonder die hulp van *CAQDAS* uitgevoer kon word nie, is gebaseer op die data vertoningsvermoë van *CAQDAS*, sowel as op die akkuraatheid en konsekwentheid waarmee *CAQDAS* sekere opdragte uitvoer. Die bevindinge wat gegenereer is deur hierdie studie blyk asof dit die hipotese ondersteun dat *CAQDAS* nie opsig self die geldigheid versterk nie, aangesien dit oorwegend bloot as 'n navorsingsinstrument gebruik word.

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CHAPTER 1

Research problem and objectives

1.1 Introduction

The importance of validating research is expressed by Tesch (1990: 71), who reflectively states that "...there is only one requirement for research: that you can persuade others that you have indeed made a credible discovery worth paying attention to". Researchers need to attest to the plausibility of their findings. This is done to ensure that, as producers of knowledge, they are held responsible for the authenticity and believability of the product of their research. One important way to convincingly communicate the validity of inferences made to an audience of research is through a description of the application of validation techniques.

The validation of qualitative research is a highly debated topic, but the introduction of technological advances within the domain of qualitative research introduces new twists and turns to the issue. Rambaree (2007) comforts by stating that presently, qualitative research is no longer questioned for its legitimacy, but the point of debate now centres on how technological developments, such as digital recorders and analytic software programmes, influence the practice of qualitative research in terms of rigour. This thesis will describe to what extent the use of these technological advances, in the form of computerised analytic software for qualitative research, contribute to the validation of qualitative research.

1.2 Statement of the research problem

The purpose of this study is to describe and illustrate how researchers – defined as authors of selected scientific research articles – have attempted to enhance the validity of their qualitative research, by making use of Computer Aided Qualitative Data Analysis Software (CAQDAS). The term CAQDAS refers

to software programmes with features designed to facilitate a qualitative approach to qualitative data (CAQDAS networking project, n.d.).

The primary intention of this study is to conduct a content analysis of scientific research articles to determine how the validity of qualitative studies has been enhanced, with specific reference to the use of CAQDAS. The main ambition is to determine whether CAQDAS has any measurable effect on validating qualitative research.

1.3 **Rationale**

The researcher became interested in the notion of validating qualitative research when she was introduced to articles describing how the trustworthiness of empirical qualitative studies was enhanced with the use of CAQDAS. The further exploration of meta-theoretical debates and commentary on the subject acted as the stimulus for the study. Qualitative research is based on recovering underlying meanings from primarily textual data, which may include figures, records, graphics (such as cartoons and drawings) as well as video recordings. The aim of qualitative research is to sincerely understand the phenomena under question. This stands in opposition to the principles of quantitative research, which aims to rigorously measure phenomena and present findings in numerical form.

There exists a dynamic debate about the application of the criterion of validity to qualitative research. It is asked whether qualitative research should be validated according to quantitative principles, or whether it should adapt its own approach to validity. Adding to this debate, the introduction of CAQDAS seems to have led to an assumption among at least some qualitative researchers that its application will automatically provide qualitative research with the necessary impression of validity. For example, Sinkovics, Penz and Ghauri (2008) argue that there exists a need to approach qualitative research in a more systematic way than is currently the case, through standardising data collection or observation, data recording and analysis. CAQDAS can formalise these procedures and therefore enhance methodological rigour. Sinkovics *et al.*, (2008) argue that, although the "...formalisation and the aim

to establish trustworthy research results do not necessarily presuppose CAQDAS", they "...maintain that its application enhances the trustworthiness and thus quality of qualitative enquiry" (691).

The need for the study is expressed by Welsh (2002), as well as Thompson (2002), who confirm that there exists in published qualitative research a lack of reporting on how data were analysed, as well as a lack of clear writing about the conceptual procedures involved. Ozkan (2004) goes straight to the point when stating that "There is a general lack of writing in qualitative research that sheds light on the 'nuts and bolts' of the qualitative data analysis" (592). This may be one of the crucial reasons why qualitative research is seen as unscientific (Welsh, 2002). Describing research procedures, with a specific focus on the methods of analysis, is ultimately what ensures the credibility of the research.

In particular, there is a tendency among some qualitative researchers to colourfully describe the context of the research and to portray their research findings in an in-depth manner, without sharing information on how inferences were made (Miles & Huberman, 1984). Johnston (2006) experienced this tendency first hand during her Doctoral research, which was based on a mixed method design. She was asked to produce her SPSS output files for examination purposes, but this requirement was not necessary for her qualitative data, where only her interview transcripts were presented, without stating what was actually performed on them. Ryan-Nicholls and Will (2009) ascribe this omission of detailed descriptions to space restrictions in journals and the general assumption that qualitative research is 'unscientific'. Richards and Richards (1991b) describe the predicament of qualitative research as follows: "Burdened with low status and a reputation for untrustworthy results, qualitative methods writing has tended to stress defiantly the meaningfulness of unstructured data and the joys of getting them, rather than the challenges and techniques handling the stuff" (39). Kelle (2004) affirms the point by stating:

Unlike standard textbooks for quantitative research, the technical literature about qualitative methods rarely described the research process in a stepwise manner as a series of procedures that followed

a set of well-defined rules. One reason for that is that the process of qualitative data analysis is open to all kinds of different decisions about how to code, what to code and where to draw the codes from. Furthermore, qualitative analysis does not consist of a limited number of well-described and documented textbook techniques. Instead it represents a heterogeneous field of diverse research styles and strategies of inquiry (445).

Therefore, although many methodology scholars describe possible methods and standards for promoting the validity of qualitative research, in describing their own studies researchers generally do not explain how these techniques were employed in practice. "So we have an unappealing double bind whereby qualitative studies can't be verified because researchers don't report on their methodology, and they don't report on their methodology because there are no established canons or conventions for doing so" (Miles & Huberman, 1984: 244). Furthermore, with regards to writing about the impact of CAQDAS on analysis, the majority of the literature is produced by the software developers themselves, or programme trainers, and reflective methodological discussions are restricted to conferences (Johnston, 2006).

Before proceeding with a statement of the research objectives, studies concerning CAQDAS use and procedures for validating research will be briefly considered. Seale (2002) investigated the use of CAQDAS features, by conducting a survey of studies that employed CAQDAS for processing and analysis of interview data. Data were collected through on-line searches of bibliographic databases of journals that report on social research, by sending out informal announcements to colleagues, and through the listing of studies on the websites of CAQDAS developers. He found that the level of analysis undertaken is relatively simple and that the analyses were conducted using only the most basic programme features, such as code-and-retrieve, searching, making memos and editing. Johnston (2006) refers to Spencer, Ritchie, Lewis and Dillan (2004), who were requested by the UK Government to develop a framework which could operate as a manual for evaluating qualitative research. Their report emphasised that qualitative research should make relevant contributions, should be based on a sound design, should be rigorous in the way in which it is carried out and should make credible claims.

Furthermore, the value of transparency was emphasised, and that it should be achieved through detailed descriptions of sampling procedures, data collection methods and the analysis process. What is very interesting, though, is that the report did not mention the use of CAQDAS in the attainment of this transparency; while Johnston (2006) strongly supports the notion that the software can amplify transparency in the research process. Johnston (2006) even states that "A discussion of the impact of CAQDAS on increased level of rigour within different methodological approaches has still to be had" (385). An investigation of how validity is enhanced with the use of CAQDAS, such as the one conducted for this thesis, may have important practical, methodological and theoretical implications for how qualitative research is conducted in the future. The study introduced in this chapter therefore maintains a meta-analytic perspective, since it reflects critically on the nature of scientific research "...in order to continuously improve the nature of scientific inquiry" (Babbie & Mouton, 2001: 14).

1.4 **Research objectives**

In this study, it is hypothesised that CAQDAS does not enhance validity *per se*, since it is purely a research tool, and it is this hypothesis that the study aims to test empirically. Dolan and Ayland (2001) emphasise this view, by stating that CAQDAS is more often a luxury than a necessity. The study will therefore determine whether CAQDAS was at all considered an indispensable necessity, or merely a luxury, in the description of the validation techniques employed. This will illustrate the importance, or redundancy, of CAQDAS in the domain of qualitative data analysis, in order to determine whether and to what extent it contributes to the validity of qualitative analysis.

This central research question is operationalised as follows: what validation techniques are reported in qualitative research articles, and which of these techniques are performed with the use of CAQDAS, and which are not? Describing the validation techniques present in qualitative studies, and examining whether they were implemented with or without the use of

CAQDAS, will help determine to what extent the use of CAQDAS was at all relevant for the validation of these studies.

In addition to asking this primary research question, the researcher is also interested in collecting data that would answer two clusters of related research questions. The first of these is: what are the most commonly used software programmes for qualitative analysis and what are their capabilities? This question is addressed in order to gain a greater understanding of what types of programmes are primarily employed by researchers, and what the types of features are that researchers look for to perform the desired analytic actions. A second additional research question that will be covered concerns the issue of trends over time with regards to CAQDAS use in general, and in relation to software preferences in particular. An investigation into this aspect will provide insight as to whether there have been any noticeable changes in CAQDAS use since its inception.

These research questions will be answered by conducting a content analysis of selected scientific articles that describe qualitative research, mention the use of CAQDAS, and make reference to how validity was enhanced. During data collection and analysis, the key variables to be considered are the validation techniques employed by researchers, and whether these techniques are performed with or without the use of CAQDAS.

1.5 **Summary**

The dynamic debate about the relevance of validity in qualitative research has been spurred on by the introduction of CAQDAS, since the belief exists that its application has the potential to grant the qualitative research process with validity, almost, in a sense, independently of the researcher. In this thesis, it is hypothesised that CAQDAS cannot automatically confer validity. The hypothesis is tested by conducting a content analysis of qualitative research articles, in which the use of CAQDAS is described in terms of how it contributed to the validation of the research. The study investigates three predominant research questions relating to: (1) the most commonly used software programmes; (2) trends in CAQDAS use over time; as well as (3) the

validation techniques reported in each scientific article, distinguishing between techniques that are performed with and without the use of CAQDAS. The ultimate goal is to determine whether CAQDAS has a significant effect on validating qualitative research.

1.6 **Outline of thesis**

The remaining chapters of this thesis will comprise of a literature review (chapter 2), background to the research design and methodology employed (chapter 3), a discussion on the results of the study (chapter 4), and the study conclusions (chapter 5). The literature review will contextualise the study, by providing a conceptual framework of qualitative research and validity in general, as well as by exploring the unique meaning attached to validity in qualitative research. Specific validation techniques, as utilised by qualitative researchers, will also be considered. Thereafter, the focus will shift to CAQDAS, which will be investigated in terms of its history and development, as well as the types of programmes, features and capabilities available. A debate about predominant benefits and dangers associated with CAQDAS will conclude with a discussion on how CAQDAS promises to validate qualitative research.

The literature review chapter will be followed by a discussion of the research design, which will aim to conceptualise the central hypothesis of the thesis, and to describe the research design, sampling techniques, data collection and capturing methods, as well as data processing and analysis techniques. Other matters discussed in this chapter include the execution of a pilot study, the timescale of the study, validity issues and, lastly, the shortcomings of the study. The next chapter, in which the main research findings are reported, will outline a profile of the sample of scientific research articles in terms of their main characteristics, and the number of cases analysed. After a detailed presentation of the results of this study, this chapter will conclude with an assessment of the significance of these findings. The final and concluding chapter offers a summary and interpretation of the main findings and lines of reasoning. A reflection on the strengths and limitations of the study, as well as recommendations for future study, will bring the thesis to a close.

CHAPTER 2

Literature review

2.1 **Introduction**

The literature review will commence with introductory conceptualisations of qualitative research and validity, as well as explanations of how the latter manifests in the former. The relevance of validity will be discussed further, by exploring the validation techniques that can be employed specifically in qualitative research. At this point, the use of CAQDAS comes into play, since its inclusion in qualitative research may be accepted as a validation technique in its own right. This background information is of paramount importance to the main research question, since it will provide insight into how, according to meta-analytical literature and methodological textbooks, researchers may validate their qualitative research, and whether the use of CAQDAS is at all required. This chapter will further cover historical trends in the use of these software programmes, describe their capabilities and features and debate their associated benefits and dangers. The literature review will conclude with a section on how CAQDAS promises to enhance the validity of qualitative research.

2.2 **Conceptual framework**

2.2.1 **Qualitative research**

Qualitative analysis can be understood as the "...conceptual analysis of narrative and description" (Boulton & Fitzpatrick, 1997: 83), since the focus is on uncovering the meaning of words (Miles & Huberman, 1984), and the goal is to create "...theory from data, rather than only testing existing theory..." (Richards & Richards, 1991a: 308). Qualitative research aims to clarify human experience and improve the understanding of the participant's world and frame of reference (Gelo, Braakmann & Benetka, 2008; Ryan-Nicholls & Will, 2009).

This is achieved by focussing on the lived experiences of individuals, as found in data obtained from interviews, observations, documents, diaries and field notes (Roberts & Wilson, 2002). The qualitative researcher does not assume the expert role; s/he rather takes on the role of active learner and aims to give a voice to the participants, by investigating their experiences and exploring facets that are arguably often ignored by the quantitative researcher. Dembkowski and Hanmer-Lloyd (1995) describe the mindset of qualitative researchers as follows: "... [they] seem to prefer to present themselves and their methods in a somewhat mysterious light suggesting that the analytic process is an idiosyncratic and, ultimately, private endeavour" (58). This point is crucial to the present study, since it is argued that many qualitative researchers do not explicitly present their procedures, and specifically procedures for enhancing validity.

During the 1920's and 1930's, major contributions were made at the University of Chicago within the domains of the materialisation and development of qualitative research methodology (Platt, 1985). However, for decades thereafter, qualitative research still received limited funding and was not rendered publishable (Morse, Barrett, Mayan, Olsen, & Spiers, 2002), until the 1980's, when qualitative research became more prominent within the social science literature. Within the academic sphere, a spirit of commercialism gave rise to writings on qualitative research in textbooks, handbooks as well as in qualitative journals. With regards to medical research, in particular oncology and palliative care, the publication of qualitative studies increased noticeably from the 1990's onwards (Borreani, Miccinesi, Brunelli & Lina, 2004). Atkinson and Delamont (2006) point out that, although qualitative research in education still has to fight for recognition in the USA, the UK leads by example by promoting training in qualitative methodology, with the collaboration of the UK Economic and Social Research Council, thereby recognising that "...qualitative research and quantitative research have their respective value, provided that they are conducted rigorously and contribute to robustly useful knowledge" (749).

However, a predominant scepticism about qualitative research still seems to exist, arising from the view that qualitative research is what quantitative research is not, since it contains "...research methods and paradigms that rely on the collection, analysis and interpretation of nonmathematical data" (Whitley & Crawford, 2005: 109). There exists a divide between quantitative research and qualitative research, and the latter is treated as the stepchild of the social research world, since it applies unstructured, exploratory techniques (Sinkovics, Penz & Ghauri, 2005). "Qualitative research has to contend with a negative definition – non-quantitative handling of unstructured data. The terms carry a tone of apology and often mean impressionistic analysis of messy data" (Richards & Richards, 1991b: 39).

The underlying meta-theoretical assumptions and associated methodological approaches of quantitative and qualitative research are worlds apart. Quantitative research operates from what is considered to be an objective position, arguing that "...reality exists independent from consciousness" (Gelo *et al.*, 2008: 269), whereas qualitative research interprets phenomena from a subjective and constructivist standpoint, stating that our experiences and knowledge are a product of personal interactions with the world (Gelo *et al.*, 2008). According to scholars who equate empiricism with experimentation and quantification, qualitative research is simply not empirical (Beeson, 1997). However, qualitative research is also based on empirical evidence; only the evidence is not numerical, but rather interpretations of narrative.

Quantitative researchers usually strive to draw relatively large random samples, as representative of even larger populations, in order to draw generalisations and statistical inferences. Qualitative researchers, on the other hand, usually select a comparatively small number of cases and examine phenomena not with the aim to generalise, but to understand those phenomena (Brown & Lloyd, 2001). Quantitative research is based on numerical information that is summarised, and mathematical procedures are utilised for statistical analysis (Gelo *et al.*, 2008). Research findings are based on mathematical models presented in statistical tables and graphs, and reported in an impersonal, third-person style. Qualitative research collects data

of a non-numerical form, does not employ statistical procedures or quantification, and aims to understand phenomena in uncontrolled, natural contexts (Gelo *et al.*, 2008; Harris, Gleason, Sheean, Boushey, Beto & Bruemmer, 2009). "Qualitative analysis is interpretive, idiosyncratic, and so context dependant as to be infinitely variable" (LeCompte & Preissle, 1993: 330).

On a meta-theoretical level, quantitative research is based on the logical positivist paradigm; it strives to obtain results based on an objective truth, to test hypotheses, make generalisations, determine causal relationships and make predictions. Logical positivism was the brainchild of the Vienna circle, a group of philosophers and scientists that existed in the 1930's. It has strong associations with empirical observation that are manipulated for experimental purposes, in order to produce logical results (Sismondo, 2004). These natural science principles, such as testing and measuring phenomena accurately through experimentation, were incorporated into the social sciences, in the hope of that the latter would experience a fortune of scientific progress similar to that attributed to the natural sciences (Gelo *et al.*, 2008). From a logical positivist perspective, the attributes and relevance of qualitative research are often discredited by archetypical fears of it being unscientific. Even the methodological literature does not sing the praises of both quantitative and qualitative approaches and "...points to dichotomy" (Sinkovcis *et al.*, 2005: 12). However, using a qualitative research methodology under appropriate research conditions can add much depth of understanding to the social science knowledge base. Qualitative research is particularly relevant for exploratory research, when variables are not yet familiar, and to generate hypotheses rather than to test them (Fitzpatrick & Boulton, 1996). Furthermore, one may argue that qualitative research can supplement, or clarify quantitative research findings and complement statistical results with a greater depth of insight and understanding.

2.2.2 Validity

Validity and the way in which it applies to differing research approaches is a contested topic and, as Morse *et al.*, (2002) warn, “The literature on validity has become muddled to the point of making it unrecognizable...” (4).

Dey (1993) defines a valid account as “...one which can be defended as sound because it is well-grounded conceptually and empirically” (228). It also needs to be objective, in the sense that it takes “...evidence without forcing it to conform to one’s own wishes and prejudices, and accepting the possibility of error” (Dey, 1993: 228). This notion of valid research is derived from a positivist discourse and translates into rigorous and systematic analysis, as well as the production of exact findings that can be openly evaluated as to be replicated (Ryan-Nicholls & Will, 2009). Rigorous research, as described by Fossey, Harvey, McDermott and Davidson (2002), is the systematic approach to research design, data collection, data analysis, interpretation and reporting.

Distinctions among four different kinds of measurement validity can be made. Face validity refers to whether an instrument appears, on face value, to measure the construct that it is supposed to measure; construct validity is the extent to which an instrument measures the construct that it is supposed to measure, based on its logical or theoretically expected relationship with other constructs; content validity is the extent to which a measure covers the range of meanings included within a construct; and, lastly, criterion validity refers to the extent to which an instrument measures the construct that it is supposed to measure, based on some external criterion, such as its ability to predict a respondent’s future performance (Wolfaardt & Roodt, 2005). According to LeCompte and Preissle (1993), validity used in such a conventional sense means accuracy in measurement, with the implication that there exists an ultimate truth that should be attained through research. LeCompte and Preissle (1993) elaborate on this point by stating that:

In this tradition validity is the extent to which scientific findings are correct; it requires determining the extent to which conclusions effectively represent empirical reality and assessing whether constructs devised by researchers accurately represent or measure categories of human experience (323).

Ryan-Nicholls and Will (2009) argue that criteria of reliability and validity have to be applied to qualitative research to some extent, so as to demonstrate that qualitative research in the social sciences is as rigorous as the natural sciences. Checks are therefore necessary to ensure that qualitative research maintains credibility in the research world. Gibbs, Frieze and Mangabeira (2002), argue that, because qualitative researchers cannot employ similar validation techniques as quantitative researchers, they have to be more aware of how their data are presented and how their findings are described.

In the quantitative paradigm, validity is understood as accuracy in measurement and attaining an objective truth. This is a far cry from the qualitative mindset, which "...seeks to understand phenomena in context specific settings..." (Golafshani, 2003: 600). In qualitative research, this positivistic conceptualisation of validity leads to a paradox: how do we know that an analysis is empirically well-grounded, when the only access to data is through our own understanding of concepts used in our analysis? (Dey, 1993).

Brown, Stevens, Troiano and Schneider (2002) refer to Lincoln and Guba (1985), who explain how the different standards of quantitative research translate into qualitative research. Internal validity is credibility, trustworthiness and truth (in the sense that participants can recognise their experience in the researcher's accounts); external validity is transferability (the applicability of findings to other settings); reliability is dependability (data represent the changing conditions) and objectivity is confirmability (others can confirm the results when presented with the same data). Similarly, Morse *et al.*, (2002) argue that terms such as internal validity, external validity, reliability and objectivity (collectively referred to as rigour) are rooted in a positivist paradigm and should be replaced by terms such as relevance, impact and utility. The above-mentioned scholars therefore argue that positivist notions of validity have no relevance within qualitative research. Seale (2004) proposes a shift in the mindset of researchers in terms of what constitutes rigorous research:

Commitment to the revelation of truth always had that 'big' quality. Maybe all we have to get now is a general sense of the value of careful scholarship, commitment to rigorous argument, attending to the links between claims and evidence, consideration of all viewpoints before taking a stance, asking and answering important rather than trivial research questions (379).

The following section will address the issue of how validity should manifest in qualitative research.

2.2.3 Qualitative research and the relevance of validity

...no matter the purpose of the study, investigators bear the responsibility of convincing the scientific community that the analysis and findings of human science investigators are systematic, objective and worthy (Wolf, 2003: 175).

This quotation by Wolf (2003) again alerts one to the question of how “valid” qualitative research is, since different researchers interpret the same data differently (Burnard, Gill, Treasure & Chadwick, 2008). Furthermore, one may ask whether validity, reliability and generalisability are only applicable to quantitative research, and whether we need alternative techniques in qualitative research to ensure quality research (Gibbs *et al.*, 2002). These are important questions to consider, as it is due to a lack of application of standardised techniques that qualitative research is seen as inferior to its quantitative counterpart: “In some professional circles qualitative research is not considered valid research and therefore not publishable” (Harris *et al.*, 2009: 87).

According to Kelle and Laurie (1995), as well as LeCompte and Preissle (1993), the validity debate in qualitative research can be grouped into three predominant categories: a belief that validity and reliability are not applicable to qualitative research, a belief that similar standards should exist for both qualitative and quantitative research, and lastly, a belief that a middle-ground should be achieved.

The first group consists of scholars who are of the opinion that reality can be interpreted in different ways and that multiple realities, which are all valid in their own terms, exist (Kelle & Laurie, 1995). LeCompte and Preissle (1993)

refer to Smith (1984), who rejects the use of what he refers to as “conventional research standards” in qualitative research. Validity, which in the traditional sense means the legitimacy of measurement, is deemed too positivistic for qualitative research, and rigour and trustworthiness arguably only have a place in quantitative research (LeCompte & Preissle, 1993). Qualitative methods therefore imply an approach to scientific inquiry that is dissimilar from that of quantitative research, and “...the epistemological foundations of the qualitative paradigm would under no circumstances allow the application” of the standards of the latter (Kelle & Laurie, 1995: 20). Furthermore, the authors state that “...qualitative methods have their roots in a paradigm which is distinct from other approaches of scientific enquiry and makes its own ‘knowledge claims’ ” (*ibid.*). According to this view, quantitative standards (internal and external validity, reliability and objectivity) arise from logical positivism, are wrongfully applied to qualitative research (Beeson, 1997) and therefore quantitative rules about validity do not apply to qualitative research (Endacott, 2008). Seale (1999) also supports this notion, by stating that quality in qualitative research should be ensured without applying insufficient methodological standards, such as validity and reliability.

According to the second grouping in the validity debate, qualitative research findings can be validated according to the experimental research replication model, which aims to obtain consistent measures, in order to make generalised conclusions across differing settings and contexts. The conventional principles of validity, reliability and generalisability would therefore, according to this viewpoint, apply to qualitative research (Kelle & Laurie, 1995). Validity, in this sense, has associations with accuracy, and in this “...tradition validity is the extent to which scientific findings are correct; it requires determining the extent to which conclusions effectively represent empirical reality and assessing whether constructs devised by researchers accurately represent or measure categories of human experience” (LeCompte & Preissle, 1993: 323).

The third and final group believes that qualitative research results should be validated, “...not to prove the perfect agreement between research results and ‘reality’, but to identify possible sources of error” (Kelle & Laurie, 1995: 22).

LeCompte and Preissle (1993) elaborate on this point, by stating that qualitative research should have its own approach to validity; the authors deem this a paradigmatic approach to validity. The approach to validity is therefore dependent on the paradigm and world view of the researcher: for example, a positivist will seek objectivity, whereas a critical theorist will seek distortions of reality. There is no one, absolute way in which phenomena may be interpreted, and the terminology associated with trustworthiness reflects this flexibility (Carverhill, 2002). Qualitative research should be validated according to its own constraints of validity, without applying quantitative notions associated with the concept (Kelle, 1995). As such, quantitative research should be measured against criteria of accuracy and objectivity of findings, whereas qualitative research should only be evaluated against criteria parallel to its philosophical paradigm and goals (Fossey *et al.*, 2002). The approach and paradigm guiding the research should therefore prescribe what are considered to be appropriate methodological standards. Beeson (1997) touches on this in the following excerpt:

The fact that social life can be viewed from a variety of perspectives does not free us from an obligation to approach it honestly and without prejudice. In that sense objectivity is essential. Recognizing that the empirical world appears different and is experienced differently depending on one's social location means that there is not simply one true view, all others being false. Rather it suggests that any one view is partial. Being objective means recognizing that some interpretations work better than others, (but not necessarily for all people), and that some interpretations cannot be sustained at all. It is our task as researchers to understand how various perspectives create and sustain particular understandings of empirical reality, regardless of our own judgment about the wisdom of their processes (26-27).

Unfortunately, the reality for the qualitative researcher is complicated, since maintaining a balance between the subjective interpretive natures of qualitative research, and ensuring its credibility within the critical domain of scientific research, is no mean task. The following concluding excerpt by Padgett, Mathew and Conte (2004) explain this dilemma:

Quantitative researchers have numerous safeguards available for enhancing the rigor of their work – starting with the choice of research design (for internal validity), going to probability sampling techniques (for external validity) and continuing with the choice of measures (for reliability and measurement validity). No such safeguards are available in qualitative methods where a sink-or-swim mentality often prevails (229-230).

It is the view of the researcher that the last statement in the abovementioned excerpt is probably too drastic. This study is based on the premise that appropriate “safeguards” do exist in qualitative research, and in the following section, validation techniques specifically appropriate for qualitative research will be considered.

2.3 **Validation techniques for qualitative research**

Rolfe (2006) is of the opinion that the lack of agreement on what exactly constitutes quality in qualitative research is due to the fact that there is first of all no agreement on what qualitative research is. No one single paradigm dominates qualitative research. For example, some methodologies are based on the narrative interpretation of texts, whereas others, such as grounded theory, strive to produce objective theory based on a positivist paradigm. Therefore, qualitative research should not be evaluated according to the expectations of one paradigm, but rather on the basis of its own individual worth (Rolfe, 2006).

Although numerous methods of validating qualitative research are discussed in detail in research methodology textbooks and other meta-analytic writings, few researchers explain their use in published studies. Moreover, it is unclear whether these techniques are performed with or without the use of CAQDAS and, by implication of the latter, what the reasons are for using CAQDAS. This study aims to describe the validation techniques that are employed in those qualitative studies that explicitly report their use, and whether CAQDAS may be considered necessary for the implementation of those techniques. In the following section, validation techniques specifically appropriate for qualitative research will be discussed, in order to orientate the investigation.

3.1 Documenting analysis process

Wickham and Woods (2005) suggest a protocol for documenting the analysis process and ensuring rigour and transparency in the reporting of qualitative data analysis. The purpose of the research should be clearly stated, so as to ensure replicability; the coding system should be derived from the research questions or literature review; and the research process should be transparent to all reviewers, so as to enable them to judge conclusions and justifications of decisions.

Analytic transparency, which can be achieved by demonstrating analytic steps, is further suggested to enhance the validity of qualitative research. Reporting on the way in which codes were formulated, criteria for their inclusion and exclusion, as well as illustrating analytic methods, will promote analytic transparency (Drisko, 1997). O'Day and Killeen (2002) explain that the analytic choices made throughout the research process, such as the chosen study design and analysis strategy, need to be explained to the reader. Miles and Huberman (1984) advocate the explanation and description of all procedural steps, decisions and conclusions made during the research process. This does not only apply to analytic procedures, but also to sampling, instrumentation, and data collection methods. Presenting methods and providing a narrative of how data were sampled, collected and analysed form the basis of this validation technique (Brown & Lloyd, 2001; Burnard *et al.*, 2008; Harris *et al.*, 2009).

Analytic transparency is the prelude to another technique of validating research, namely an audit trail, which refers to the documentation of all procedures for external evaluation purposes (Mellion & Tovin, 2002; Padgett *et al.*, 2004; Whitley & Crawford, 2005). All processes have to be described and memos and notes presented, while justifying the decisions and interpretations (Ryan-Nicholls & Will, 20009). According to Wolf (2003), an audit trail is purely a record of the analytic process, from raw data to the final interpretations.

2.3.2 Member validation

In terms of specific techniques, participant collaboration, also referred to as member validation or member checks, is commonly used in (or rather prescribed for) qualitative research (Babbie & Mouton, 2001; Brown *et al.*, 2002; Drisko, 2004; Fitzpatrick & Boulton, 1996; Fossey *et al.*, 2002; Harris *et al.*, 2009; LeCompte & Preissle, 1993; Mellion & Tovin, 2002; Ryan-Nicholls & Will, 2009; Sandelowski, 1995; Seale, 1999; Whitley & Crawford, 2005). It can be defined as the verification of data interpretations, by obtaining feedback from the respondents themselves, in order to limit investigator bias (Miles & Huberman, 1984; Padgett *et al.*, 2004). "Member validation can be understood as the researcher community seeking communication with (and perhaps reassurance from) members of the wider community with whom (or on whom) research is done" (Seale, 1999: 64).

2.3.3 Theoretical consistency

Theoretical consistency (LeCompte & Preissle, 1993) should, it is argued, ensure that all the elements of the research process are in harmony with each other. For example, the paradigmatic approach of the research project should guide the goal of the research, which would lead to fitting research questions, as well as appropriate sampling techniques and data analysis procedures that should be employed to address these questions.

2.3.4 Peer review

Peer reviews and debriefing is another way of validating data, in this case through an external panel of experts, in order to analyse the data through differing lenses (Babbie & Mouton, 2001; Brown *et al.*, 2002; Drisko, 2004; LeCompte & Presissle, 1993; Mellion & Tovin, 2002; Padgett *et al.*, 2004; Sandelowski, 1995).

2.3.5 Reflection

Reflection and introspection (Drisko, 2004) should be employed to combat investigator bias. "The more aware researchers are of what they are doing, the more they can make public these interpretive, idiosyncratic and context-dependent approaches. This permits open scrutiny, discussion and assessment" (LeCompte & Preissle, 1993: 330). This cluster of techniques is therefore based on taking into account the researcher's own effect on the study, in terms of personal biases and pre-existing theoretical positions (Brown & Lloyd, 2001). Reflection includes a number of specific techniques, such as critique of categorisation, reviewing notations, discussing borderline or extreme cases, considering the quality of sources, and cross-referencing one's observations from a range of sources (Dey, 1993). A reflexive research process can be achieved by keeping a reflexive journal (Mellion & Tovin, 2002), by maintaining a good self-awareness (O'Day & Killeen, 2002), by acknowledging the impact of the researcher on the research setting (Endacott, 2008), and by reflexive reporting (Fossey *et al.*, 2002).

2.3.6 Negative case analysis

Seeking negative, extreme, or deviant cases is another method for testing a theory by comparing it to conflicting evidence (Brown *et al.*, 2002; Endacott, 2008; Fitzpatrick & Boulton, 1996; Fossey *et al.*, 2002; Miles & Huberman, 1984; Seale, 1999; Whitley & Crawford, 2005). Negative case analysis involves deliberately looking for disconfirming or deviant cases and rival explanations within an entire corpus of collected data, in order to test the accuracy of interpretations (Burnard *et al.*, 2008; Padgett *et al.*, 2004), and in effect, to disprove conclusions (Ryan-Nicholls & Will, 2009). This is done to control for investigator bias (Harris *et al.*, 2009).

2.3.7 Inclusion of raw data

Including raw data allows the reader to determine whether the research interpretations and conclusions drawn are plausible, considering the evidence that is presented. Raw data include memos, as well as notes about

participants' choice of words and behaviour (Drisko, 1997). Therefore, detailed note-taking can promote validity, since "Validity has to do with approximating real phenomena, and richer data increase the probability of this" (Harris *et al.*, 2009: 87). The inclusion of meaningful quotations and thick descriptions will also aid this process (Mellion & Tovin, 2002), as it allows the reader to evaluate the researcher's interpretations of the data (Fossey *et al.*, 2002).

2.3.8 Field procedures

Other techniques include prolonged engagement or involvement, and persistent observation in the research field or setting (Babbie & Mouton, 2001; Endacott, 2008; Harris *et al.*, 2009). This should ensure depth of familiarity with the research respondents and research phenomena under investigation (Padgett *et al.*, 2004).

2.3.9 Systematic analysis procedures

According to Brown and Lloyd (2001), collecting and analysing data systematically will contribute considerably to the validity of the analysis. Sinkovics *et al.*, (2008) add to this, by suggesting a framework to explain the research process step by step. They also argue that the use of CAQDAS supports systematic analysis by formalising coding, storage of data, text retrieval, and the making of memos.

2.3.10 Independent coders

Team research and the use of independent coders (Ryan-Nicholls & Will, 2009) are methods of corroborating findings (Sandelowski, 1995), which should enhance inter-rater reliability (Whitley & Crawford, 2005). Constant comparison, through the re-reading of text to identify emerging themes, is another way in which conclusions may be verified (Burnard *et al.*, 2008; Miles and Huberman, 1984).

2.3.11 Triangulation

The final technique to be considered here is that of triangulation (Endacott, 2008; Fitzpatrick & Boulton, 1996; Padgett *et al.*, 2004; Sandelowski, 1995; Whitley & Crawford, 2005), or the use of multiple methods in a single study (Babbie & Mouton, 2001). Golafshani (2003) refers to Barbour (1998), who states that triangulation is generally used in quantitative research in order to confirm generalisations. Seale (1999) distinguishes among different forms of triangulation, and contends that data triangulation involves not only the use of different sources of data, but also at different points in time. Investigator triangulation is primarily a form of team research to discuss biases. Theory triangulation implies approaching the data with different hypotheses in mind, and finally, methodological triangulation refers to the use of multiple methods from differing research perspectives. Mellion and Tovin (2002) as well as Ryan-Nicholls & Will (2009) add to this list, by stating that source triangulation is another method for verifying trustworthiness.

Within the qualitative paradigm in particular, triangulation may be achieved by making use of multiple methods of data collection, such as in-depth interviews, observation, case studies and/or focus groups (Brown *et al.* 2002; Golafshani, 2003), while investigator triangulation promotes cross-comparisons (Harris *et al.*, 2009).

2.4 **CAQDAS: development and trends**

Although CAQDAS programmes were created in the 1960's (Carvajal, 2002), up to the early 1980's qualitative analysis was predominantly assisted with the help of word processors and data-based programmes, intended for recording data in the form of an indexing system (Weitzman & Miles, 1995). It was only during the late 1980's to early 1990's that computer programmes to support the analysis process through code-and-retrieve programmes became more commonplace (Mangabeira, Lee & Fielding, 2004; Peters & Wester, 2007). The introduction of CAQDAS in the 1980's was met with scepticism and a concern about what effect technology may have on the qualitative analysis process, but

now it seems to be generally accepted that technology and qualitative analysis can co-exist (Atherton & Elsmore, 2007; Carvajal, 2002).

As the software became more commonly used, there arose an increased need for a higher level of sophistication in CAQDAS, up to the point where these programmes can perform procedures that are not otherwise possible (Mangabeira *et al.*, 2004; Smit, 2005). This led to a growth in the commercialisation of the software programmes (Mangabeira *et al.*, 2004), and free online tutorials for these programmes further facilitated an increase in their use (Johnston, 2006). Due to the targeting of differing audiences in the marketing of these programmes, CAQDAS is no longer solely used in academic settings, and is employed by researchers concerned with applied research (Mangabeira *et al.*, 2004). CAQDAS has increased the popularity of qualitative research among those who conduct research primarily within the positivist paradigm (Johnston, 2006), and even research conducted outside of the realm of the social sciences, since it is increasingly used for medical research, market research and mixed method research (Mangabeira *et al.*, 2004).

2.5 **CAQDAS: debating the pro's and con's**

2.5.1 **Software dictating research**

"The appeal of computer analysis should never be allowed to overwhelm good research design; valid research design lies in human hands" (Kondracki, Wellman, Fada & Amundson, 2002: 226). This quotation illustrates the responsibility of the researcher to maintain control over the research process. The belief that research procedures would become rigid with the use of CAQDAS, as expressed by LeCompte and Preissle (1993), implies a concern that the research process will become defined by what the particular software programmes can or cannot do. Qualitative research is significant at the conceptual and theoretical level; although computers can be helpful in confirming or supporting intuitive processes, computers only make contributions at the textual level, and CAQDAS users need to realise that the analysis of data is only as good as the researcher's knowledge, skills and budget. According to Drisko (2004):

Qualitative data analysis software can be a very useful tool, but it does not replace the primary role of the researcher as analytic decision maker. Qualitative data analysis requires ongoing and reflective decision making by the researcher in conjunction with peer reviews and feedback from respondents (member checks). The actual judgements about the meaning, relevance, and importance of any given data must always be determined by the researcher and not the software alone (201).

There is general agreement that researchers should not allow the software to dictate an analysis, by centring it on what a programme can and cannot do, as this will result in a cook-book approach and homogenisation of analysis (Barry, 1998; Carvajal, 2002; Conrad & Reinharz, 1984; Dolan & Ayland, 2001; Lu & Shulman, 2008; Morrison & Moir, 1998). Moreover, when a researcher becomes more engaged with software than with data (Tallerico, 1991), it may lead to an exclusion of what the software is unable to handle, i.e., an exclusion of non-textual data. "Analysis then reduces to what the computer can do; if the computer cannot do it, then it no longer gets done. The technology takes over from the task, and data which cannot be analysed by computer are ignored" (Dey, 1993:61). Once a researcher designs research questions to fit the software, and data which cannot be analysed by the computer are ignored, the programme drives the research (St John & Johnston, 2000). Technology may also dictate conceptual concerns and analytic interests. The problem starts when technology starts to "...drive the research rather than serve the research, and that parts of the social world and social phenomena would be lost because of this" (Seidel, 1991: 115). Mechanistic data analysis prevents the use of intuition, insight and feeling (Dembkowski & Hanmer-Lloyd, 1995). It also seems that many researchers may prefer certain programmes on the basis of the ease of their operation, and not because of their methodological purpose, which results in an analysis that is dictated by technology (Seidel, 1991).

To prevent an imposition of software on the qualitative methodology, researchers should be critical of the weaknesses and limitations of a programme, and not fall prey to neophillia: the blind trust in technology (Carvajal, 2002). When researchers are pressurised to adopt certain

programmes (St John & Johnson, 2000), for whatever reason, it may result in the use of CAQDAS when it is inappropriate for the type of analytic strategy required to address the research questions. For example, particular software programmes are based on only one analytic strategy, grounded theory to be more to the point, and there is a tendency to favour code-and-retrieve programmes (Lu & Shulman, 2008; St John & Johnson, 2000; Webb, 1999). Gibbs *et al.*, (2002) ease our minds, however, when they state that CAQDAS is now more flexible and less rooted in only one analytic approach.

To further prevent software from dictating analysis, Weitzman and Miles (1995) suggest asking a number of questions before research commences, for example, to ask what kind of database project would be involved. This will not only determine the capacity of the database, but also whether a software programme will be used that stores fixed records, as opposed to a programme that can cope with revised records and that has editing capabilities. Secondly, the type of analysis should be taken into account: is it exploratory or confirmatory? Exploratory research relies on inductive coding, which requires easy code-and-retrieving functions, whereas confirmatory research that is based on deductive coding, will require software that aids theory-building. Also, Weitzman and Miles (1995) suggest that the intention of certain data displays should determine the type of display (such as matrices, networks, diagrams or code lists) that is ultimately chosen.

2.5.2 **Software types and capabilities**

CAQDAS programmes are applicable to different types of research designs, such as socio-linguistic and conversation analysis, ethno-methodological approaches, grounded theory and content analysis (Parmeggiani, 2008). A brief explanation of what these types of analysis entail will be provided in order to demonstrate how CAQDAS can assist the analysis process. Socio-linguistic and conversation analysis is the analysis of social interaction by deconstructing talk in action. The studied 'talk' can refer to any ordinary conversation, interviews, courtroom questioning or even political speeches (Goodwin & Heritage, 1990). Grounded theory refers to a method of analysis based on

inductive reasoning, and that aims to build theory throughout the analysis process about the social phenomena being studied (Babbie & Mouton, 2001). Content analysis dissects communication - be it written, verbal or visual - and it is commonly used in disciplines such as journalism, sociology, psychology and communication (Elo & Kyngäs, 2008). It can be applied in either quantitative research (by generating word frequency lists or listing words into categories for statistical purposes), or in qualitative research (by examining differing meanings of words or considering thematic relations of words) (Elo & Kyngäs, 2008). CAQDAS can aid these analysis approaches, for example, in socio-linguistic approaches, video recordings allow the analysis of verbal and non-verbal communication, such as the types of speech used, body language, eye movements, etc. (Parmeggiani, 2008).

Tesch (1991) states that software capabilities are either primarily language-orientated, descriptive-interpretive orientated, or theory-building orientated. The first approach, which is language-orientated, seeks to understand the usage of language and the meanings of particular words in their examined contexts. This type of approach is relevant to research designs such as content analysis, discourse analysis, ethnography of communication, and symbolic interaction. According to these types of analysis, language is either seen as communication, in the sense that it operates within a context and confers certain speech acts, or it can be seen as culture, portraying something of symbolic interaction through utterances, actions and semantic relations. Descriptive or interpretive research, the second approach, produces a detailed narrative of the characteristics under investigation, in order to gain insight and understanding. Relevant approaches are holistic ethnography, life history studies, and document analysis, which all aim to provide systematic descriptions, rather than to generate theory. The third approach, theory-building research, seeks explanations and aims to make relational linkages, in order to test hypotheses. This approach is relevant to grounded theory (Tesch, 1991).

Fielding (2002) distinguishes among three types of programmes: text retrievers (retrieve words or text strings), code-and-retrievers (retrieve

segments by codes) and theory-builders (coding and retrieving with relationship network building). Lee and Esterhuizen (2000) developed a similar classification, by distinguishing between code-and-retrieve programmes, which recover codes and the text with which they are associated, code-based theory builders and conceptual network builders, which graphically show interconnected nodes and links. Morison and Moir (1998), as well as Weitzman (1999), expand the programme classification to five programme types, namely text retrievers (Metamorph, Orbis, SonarProfessional, The Text Collector, ZyINDEX), text-base managers (askSam, FolioViews, NEW.MAX, Tabletop, Idealist, TEXTBASEALPHA, Info Tree32xT), code-and-retrieve programmes (HyperQual2, Qualrpo, Ethnograph, Kwalitan, The Data Collector), code-based theory builders (AQAUD, Atlas.ti, HyperRESEARCH, NUD.IST, winMAX, Code-A-Text, QCA) and conceptual network builders (Inspiration, MECCA, MetaDesign, Semnel, Atlas.ti).

According to Dolan & Ayland (2001), CAQDAS is predominantly used for data administration and archiving, rather than for analysis purposes, since the most commonly used programmes, such as Atlas.ti, NUDIST, FolioViews and HyperRESEARCH, are all code-based theory builders. Text-base managers are database programmes used to store, search, retrieve, sort and summarise text, with the purpose of classifying concepts and evaluating hypothetical propositions. These programmes can often generate tables with selected variables, so as to link qualitative and quantitative data (Weitzman, 1999; Wolfe, Gephart & Johnson, 1993). Text retrieve programmes are able to search text, retrieve words or segments and count the frequencies of words. The aim is to answer questions about specific word use, concepts represented by key words, and/or certain categories, and therefore it is ideal for content analysis, which investigates frequency distributions of words, or explores the underlying issues portrayed in the text (Wolfe *et al.*, 1993).

Code-and-retrieve programmes are able to categorise text according to tags attributed to segments, and then to retrieve and display these segments according to their assigned coding. They are also able to store accompanying memos (Weitzman, 1999). Text analysis programmes, also known as code-

based theory builders, aim to describe and interpret the text through building theory, testing hypotheses and constructing higher-order classifications. Text that is of theoretical interest is firstly coded, and then relationships among these codes are established. Recurring patterns that emerge in these relationships ultimately lead to hypothesis development (Weitzman, 1999; Wolfe *et al.*, 1993). Lastly, conceptual network builders can display relationships among concepts through graphic representations and diagrams (Weitzman, 1999).

Some of the most well-known CAQDAS programmes are Atlat.ti, HyperRESEARCH, MAXqda, N6, NVivo, Qualrus, QDAMiner, AnSWER, InfoRapid and CLAN (Parmeggiani, 2008).

2.5.3 **Benefits and dangers associated with CAQDAS**

2.5.3.1 Speed, volume...and superficiality

The advanced speed at which CAQDAS can accomplish managerial tasks, adds to its appeal (Kondracki *et al.*, 2002). Data analysis procedures are much faster than manual ones, due to the automating of mechanical tasks, which, it is argued, saves the researcher the time to focus on more important conceptual aspects of the analysis (Barry, 1998; Conrad & Reinharz, 1984; St John & Johnston, 2000; Weitzman, 1999). CAQDAS allows quick and efficient revisitation of the data, and it also helps the researcher to become familiar with large amounts of data within a relatively short space of time. However, CAQDAS does not always save time, since the coding process in itself, whether done manually or electronically, is a time-consuming process (Drisko, 2004; Fielding, 2002; Parmeggiani, 2008; Smith & Short, 2001). Furthermore, it takes time to master a programme (St John & Johnson, 2000).

There is nothing more daunting to a qualitative researcher than sitting at a desk, staring at the research data printed on yards of paper, while being equipped with nothing but scissors, glue, post-it cards and an ensemble of psychedelic highlighters. CAQDAS can overcome the challenge of voluminous data (Lu & Shulman, 2008; Rettie, Robinson, Radke & Ye, 2008; St John &

Johnson, 2000; Webb, 1999). The researcher may miss things, due to the overwhelming magnitude of the data, since the "...volume and complexity of unstructured qualitative data can result in pressures to settle for simple, fixed, indexing systems and can encourage themes that emerge early in the research process to dominate analyses" (Wolfe *et al.*, 1993: 638). The computer speeds up the interpretative process, which in turn aids in-depth exploration.

Quick coding ensures that more coding can be done than is the case with manual methods, but a greater number of codes does not imply a better understanding of the data. "There is the possibility that the use of computers may tempt qualitative researchers into 'quick and dirty' research with its attendant danger of premature theoretical closure" (Lee & Fielding, 1991: 8). A researcher may also develop a false sense of productivity, due to speed of coding and organising (Tallerico, 1991). It may also be that CAQDAS merely creates a perception that coding is more rigorous and that data is interpreted more confidently (Welsh, 2002). Also, with a larger amount of data, the focus may fall on the raw quantity of the data, instead of on delving into meanings, which ultimately results in superficial analysis (Lu & Shulman, 2008; Seidel, 1991; St John & Johnston, 2000).

2.5.3.2 CAQDAS as a team player

The analysis process, when assisted by CAQDAS, is more transparent, which some might say renders it more scientific, rigorous and valid (Lu & Shulman, 2008; St John & Johnston, 2000). This transparency is achieved by making analytic procedures and documentation of all analytic procedures available through a visible audit trail of the data analysis, in order to retrace logical steps (Wickham & Woods, 2005) and to hold researchers accountable (Fielding, 2002; St John & Johnston, 2000). Rettie *et al.*, (2008) reports that, according to a survey on CAQDAS awareness in the UK, people believe that analysis with the use of these software programmes is thorough and consistent, since all steps are carried out in the same way (Fielding, 2002). Parmeggiani (2008) seconds this, by stating that CAQDAS improves accuracy and control. By increasing transparency, CAQDAS can support team-based research (Sandelowski, 1995), in which audit trails exist for each researcher,

so as to guarantee consistency and making evidence available for testing and replication for inter-subjective understanding (Cousins & McIntosh, 2005). Logs of analytic steps make the interpretation process more explicit, replicable and accessible to secondary analysis (Dembrowski & Hanmer-Lloyd, 1995). The same data can be analysed and interpreted from different perspectives. The audit trail also permits thinking procedures to be traced by others (Maclaran & Catterall, 2002).

However, the opposite can also be true. Lee and Fielding (1995) conducted a study about user's experiences of CAQDAS, and found that the use of CAQDAS in team research does not necessarily promote collaborative teamwork and check-ups. "It emerged that none of those who used CAQDAS on a team project had analysed the data collectively" (38). The software can also cause labour divisions, as each team member has a different responsibility. Labour divisions may become a danger, if it inhibits interactive exploration and compromises the transparency of the research process. With regards to team research, the basis of its appeal lies in the fact that team members can question the work of others and provide insights into uncharted outlooks.

2.5.3.3 Untutored access and the money game

It seems that in recent times, CAQDAS programmes have, by and large, become a must-have, and the ability to download trial versions of the programmes, together with the online tutorials and manuals, make it even more accessible to the average Joe. However, the untutored use of CAQDAS poses a threat to the research process, since it may produce off-target analysis, which can also be very time-consuming. Moreover, the untutored and inappropriate use of CAQDAS is a danger in itself (Fielding, 2002; St John & Johnson, 2000). The untrained use of CAQDAS may result in its misapplication, and users should be aware of the limitations of these tools. Quantitative analytic tools also require training (Cousins & McIntosh, 2005), and therefore mastering CAQDAS can distract the user from focussing on the key analytic issues at hand (Lu & Shulman, 2008). A need therefore exists for the publication of step-by-step procedures for the use of programmes, similar to those that exist for quantitative, statistical programmes (Peters & Wester,

2007). Johnston (2006) adds to this by stating that new users, who may also be unfamiliar with qualitative research methodology, rely heavily on the teaching tutorials accompanying the software. This may result in the inappropriate use of the programmes, since the tutorials only aim to explain the functional aspects of the programmes and do not address methodological aspects of research. Peters and Wester (2007) are adamant when they say that novice researchers are unable to select appropriate qualitative approaches, not to mention the most suitable CAQDAS programme for their analysis. Webb (1999) emphasises this, by stating that not all qualitative data is fit for CAQDAS, and that it should only be used if necessary. Therefore, users should decide on a programme based on the purpose, questions and methods of the research (St John & Johnson, 2000). The problem of advocacy versus commercialism is explored by Tallerico (1991). CAQDAS programmes are expensive (Drisko, 2004; Smith & Short, 2001), and therefore the marketing of these programmes is based on selling the programmes at all cost, and not on informing the potential user on which product will be suitable for their research needs.

2.5.3.4 CAQDAS as a management tool

The ability of CAQDAS to manage data is certainly one of its greatest attractions. CAQDAS is not linked to grounded theory by default, but nevertheless, grounded theory is a highly effective manner for managing data, for which CAQDAS provides the necessary tools (Lee & Fielding, 1996). "Computer software should be used where it can reduce tedious work or increase accuracy", according to Kondracki *et al.*, (2002: 226), since it speeds up the analysis process and promotes more consistent investigation, by automating repetitive tasks (Cousins & McIntosh, 2005). By eliminating some of the logistical problems related to the management of data, the researcher's mind is arguably free to focus on analytical creativity. The software can "...encourage the researcher to become playful and to try multiple ideas on the data, since the mechanical part of the analysis process is no longer cumbersome" (LeCompte & Preissle, 1993: 279). However, the researcher

should be mindful that sorting and filing does not equate valid and meaningful analysis (St John & Johnson, 2000).

Data management encompasses the indexing of data, storing of data, as well as retrieving text segments or codes, editing, counting of frequencies, coding of segments, making memos and conducting text searches (Barry, 1998; Conrad & Reinharz, 1984). CAQDAS, in essence is an "...electronic filing cabinet" (Fielding, 2002: 170). Indexing allows the researcher to create alphabetic word lists, so as to promote the systematic exploration of the data and to identify underlying themes within the text (Maclaran & Catterall, 2002; Tesch, 1991; Webb, 1999; Whitley & Crawford, 2005).

The ability of CAQDAS to store data represents another of its main attractions (Dembkowski & Hanmer-Lloyd, 1995; Whitley & Crawford, 2005). It allows the researcher to bring the elements of the data together (Maclaran & Catterall, 2002), as all the data is saved in an archive (Parmeggiani, 2008). The software can store all relevant project information, such as tapes, field notes, and photographs; keeping everything together and accessible for interpretations (Maclaran & Catterall, 2002). The computer is also more efficient in keeping record of file transactions, as text can be tagged with a label, listed and compared across themes. The benefit of handling the mechanistic actions associated with data analysis, aids conceptual thinking, since it allows the researcher to play with data (Barry, 1998). The stored material can also be retrieved in text strings (Dembkowski & Hanmer-Lloyd, 1995) and even keywords in context (Cousins & McIntosh, 2005).

Editing facilities allow the correcting and revising of, for example, codes in a consistent manner (Weitzman, 1999), which in turn adds value to the systematic exploration of the data. These editing capabilities can be global or selective, and categories can be collapsed or renamed. CAQDAS can make analysis more flexible and there exist few limitations on the number of codes that can be generated, and these coding systems can be changed, by merging, deleting or even moving them consistently. Notes can be added even as the project progresses (St John & Johnston, 2000), and the analysis is kept open to new ideas and concepts, which can be inserted as they occur (Lu &

Shulman, 2008). A danger associated with CAQDAS is more a reflection on human error than on a limitation of the computer: CAQDAS cannot undo, and backups of all files should be created regularly (König, n.d.).

CAQDAS also facilitates the counting of words, so as to determine the frequency of their occurrence (Tesch, 1991). Frequency counts are conducted with accuracy and speed, which allows for pattern identification (Tallerico, 1991). As such, CAQDAS has the potential to blur the boundaries between qualitative and quantitative research, since some of the programmes can link qualitative analysis with quantitative and statistical results (Gibbs *et al.*, 2002). For example, codes can be matched with demographic data, and frequencies of instances can be calculated (St John & Johnson, 2000). Hesse-Biber and Dupuis (1995) are of the opinion that applying quantitative logic to qualitative data, by conducting frequency counts, for example, the representativeness of the data is increased. Index systems can also link to quantitative techniques, as well as produce quasi-statistics about the number of occurrences of words (Richards & Richards, 1991b).

Although quantitative research results are usually presented in an organised fashion, whereas qualitative research results are most often presented in a narrative and descriptive way, this discrepancy can be overcome by presenting all procedures and methods in an organised manner. In this regard CAQDAS provides procedural advantages, when compared to manual techniques, with regards to formalising procedures (Sinkovics *et al.*, 2005). CAQDAS therefore gives qualitative research a "...technical appearance of formality" (Fielding, 2002: 174). The positivist influence is once more evident in these assumptions, since these authors argue that qualitative research is validated through the combination with quantitative research results. According to Richards and Richards (1991b), computers justify rigorous methods of data processing, but this should not discredit the nature of qualitative research:

That computers also allow identification of deviant cases and enumeration of occurrences of patterns, verification of hypotheses, 'quasi-statistics' and grounding of claims in rigorous text searches will inevitably force reassessment of the relationship of qualitative and

quantitative techniques – but the latter need not undermine the former (41).

Concern has arisen about the possibility of qualitative research being analysed quantitatively. Some programmes allow researchers to perform analysis techniques suited to quantitative data, such as statistics of text and imports from programmes such as SPSS (Barry, 1998), which may be inappropriate numerical analysis for qualitative research. Similarly, Morrison and Moir (1998) ask how it is possible for an analytic paradigm rooted in interpretation to be given an air of objectivity through the use of a computer. Digital tools may distort the real meaning of what is conveyed in text and speech by quantitatively categorising language of feelings, emotions and subjective understandings. CAQDAS has positivist or quantitative features (such as frequency counts), which may fracture data and lead to a loss of meaning (Roberts & Wilson, 2002). This once again illustrates the pervasive influence of the positivist paradigm, which creates the belief among researchers that their qualitative results will have greater merit when they succumb to positivist standards of accuracy in the measurement of a universal truth.

As a management tool, CAQDAS may facilitate deeper analysis: reflective comments and annotations can be added to codes, notes or even text files, through the ability of CAQDAS to attach memos (Drisko, 2004; Webb, 1999; Weitzman, 1999). As such, it is argued that CAQDAS improves the process of critical reflection and interpretation (Parmeggiani, 2008).

CAQDAS can also facilitate in the coding process in particular, which is essentially the act of attaching keywords or symbols to segments of text (Tesch, 1991), and categories can be developed inductively, or theories can be tested deductively, but the coding system remains the product of the researcher (Dembkowski & Hanmer-Lloyd, 1995). In programmes such as Atlas.ti, for example, coding can be done in various ways, as explained by Babbie and Mouton (2001). Free coding refers to codes to which no text segments are attached: open codes are created, where after text is attached. An *in vivo* code refers to a code which is based on text as it appears in the selected segment. Auto-coding operates by searching for specified words, phrases, or paragraphs, creating a code, and coding the search findings

automatically. In addition to these coding operations, axial coding (selecting a code from an existing list) and quick axial coding (applying the last selected code) can also be performed (Weitzman & Miles, 1995).

CAQDAS further serves as a management tool through its search function, which enables a researcher to accurately locate words and phrases (Tesch, 1991) by means of primarily simple searches (that retrieve desired text strings or codes), placeholder searches (that use placeholders for certain characters in searches) and Boolean searches (that use AND, OR, and NOT search operations) (König, n.d.). The less frequently used proximity searches that search segments occurring within a specific distance of each other (Dohan & Sánchez-Jankowski, 1998), as well as co-occurrences of codes and associations of codes (Webb, 1999), can aid hypothesis testing, by determining whether concept A causes B, due to its consistent proximity to concept B (Seale, 2002).

With regard to the CAQDAS search functions, concern has been raised that researchers will be distanced from their data when using CAQDAS (Lee & Esterhuizen, 2002; LeCompte & Preissle, 1993; Morrison & Moir, 1998; St John & Johnson, 2000; Webb, 1999), by losing an overview of the data when working only with lists of quotations, codes and fragments of text that are removed from their context (Dembkowski & Hanmer-Lloyd, 1995). Webb (1999) describes this distance as the alienation from the data and a preoccupied focus on codes, which is removed from context. Weitzman (1999) elaborates by stating:

You may wind up looking at only small chunks of text at a time, or even just at line-number references to text locations. This is a far cry from the feeling of deep immersion in the data that comes from reading and flipping through piles of paper (1259).

Dey (1995) also states that code-and-retrieve programmes in particular can fragment data through a "loss of narrative", (70), and isolating the retrieved text from the surrounding text. A related concern is expressed by St John and Johnson (2000):

The meaning of words or phrases is derived from context, body language, and inflection, and a meaning may be implied without

using actual words. Using technology in qualitative research may strip away the meaning with which inflection and body language imbue words. The codes may become objects manipulated by the researcher, with a life and meaning of their own, divorced from their context (396).

According to Smith and Short (2001), however, this is a thing of the past, since new technology does not distance the reader and considers context and paralinguistic cues. It can even allow you to code directly from audio sound files. Sound offers other aural dimensions; interpreting silences, pacing, pitch, tone and volume. "Listening to and viewing the data allows us to retain paralinguistic cues (body language and the like) that supplement the verbal message" (Smith & Short, 2001). Moreover, the software programmes promise to achieve quite the opposite of alienation, since they can illustrate the context of selected quotations and text (Dembkowski & Hanmer-Lloyd, 1995; Tallerico, 1991). The retrieve function of most programmes display code words and extracted text within their context (Huber & Garcia, 1991). Furthermore, with hypertext the researcher can get closer to the data than what has ever been possible with paper (Weitzman, 1999). Hyperlinks can be created between the codes and text segments, between the text and context from which it is derived, or between text segments themselves (Dey, 1995). Gilbert (2002) explained closeness to data as a living knowledge of the data, being able to handle the data and understanding and monitoring the research operations. According to Barry (1998), distance from data with CAQDAS is not possible, since data is reread and familiarity is obtained. It may therefore be argued that CAQDAS does not distance the researcher from the data. If anything, the computer reduces the distance between analyst and data, making it less overwhelming and more approachable (Dohan & Sanchez-Jankowski, 1998).

2.5.3.5 CAQDAS: invading analysis

With regard to the role of CAQDAS as a management tool, there exists a false belief that CAQDAS will, in a sense, take over the analysis, by analysing the data for the researcher (Lee & Fielding, 1991:6): "Is the computer, as some writers have suggested, a genie in the bottle which, once released, will

transform the activity of field research in unnoticed and unwelcome ways?”. This, I would argue, is impossible, since the software programmes are unable to analyse, and are only capable of organising and searching the data, and assisting interpretation (Carvajal, 2002; LeCompte & Preissle, 1993). CAQDAS, as Barry (1998) notes, is purely a research tool.

According to Maclaran and Catterall (2002), the misconception that CAQDAS may analyse data for the researcher stems from the way in which qualitative analysis software is marketed or defined, i.e., “...as assisting with data analysis and this is rather misleading. In fact, a more appropriate description would be that programs assist primarily with data management” (30). In other words, an analytic tool is promoted as analyser in itself (Fielding, 2000). Carverhill (2000) even considers these software programmes “...somewhat of a misnomer in that their principal usage seems to be in managing and organising the vast amounts of data often collected in qualitative projects” (203).

CAQDAS does aid coding, but it is no substitute for thoughtful and intelligent analysis (Dolan & Ayland, 2001). “No amount of computer technology can substitute for critical thinking. Indeed, complex computer programmes may inhibit critical thought because the researcher may become overly concerned with technical aspects of data preparation rather than concentrating on subjective interpretation” (Chapple & Rogers, 1998: 559). The analysis may still be filled with judgemental errors on the part of the researcher (Drisko, 2004). Therefore, CAQDAS cannot generate output ready for a report. The researcher has to write his/her own conclusions. “Qualitative software is, even now, quite limited in the kinds of support it offers for analysis, and there is no prospect that it will ever excuse the need for researchers to think” (Fielding, 2002: 162). LeCompte and Preissle (1993) also emphasise this point by stating that, “Computers cannot yet perform any conceptual functions or recognise the meaning of language. They do not think” (279). Mangabeira *et al.*, (2004: 175) do, however, warn that when CAQDAS users learn the programmes “...in isolation from an appreciation of qualitative method, there is a risk that the analytic features in their chosen programme will come to stand for them as

qualitative analysis”, which suggests that, in such cases, the software does indeed have the potential to take over the analysis.

2.5.3.6 The untapped potential of CAQDAS

Searches promote relationship building, by constructing a visual network and, with the advances in hypertext, links can be built between texts, since “...it enables the researcher to move through the data in ways that were previously impossible” (Demkowski & Hanmer-Lloyd, 1995: 56). Hyperlink functions link texts with segments from other documents (Cousins & McIntosh, 2005). Pop-up notes and the hypertext linking together of memos (Dohan & Sánchez-Jankowski, 1998) can add depth to an analysis perhaps not possible without the use of these software programmes. CAQDAS can examine more complex links in the data with hypertext links (Barry, 1998), Boolean searches, automatic coding, cross-matching and frequency counts (Lu & Shulam, 2008) and it is able to link data to picture files or audio clips (St John & Johnston, 2000). This enables hypothesis testing, as co-occurrences of codes and relations between codes, as well as relational links between data elements, can be graphically represented with pictorial representations (Maclaran & Catterall, 2002). Theory builders assist the user to develop theories and test hypotheses (Gibbs *et al.*, 2002), which can be facilitated by the ability of the software to illustrate conceptual maps of the theoretical models (Seale, 2002). CAQDAS can generate lists or graphic maps of codes, demonstrating their inter-relationships (Dohan & Sánchez-Jankowski, 1998) and building networks (Drisko, 2004). Network analysis is facilitated with the graphic display of nodes in a network (Cousins & McIntosh, 2005).

One of the more advanced features of CAQDAS programmes is the ability to import text, audio and visual files (Seale, 2002), thereby allowing for the combining of different media types (Cousins & McIntosh, 2005; Dohan & Sánchez-Jankowski, 1998). With newly available technologies, voice recognition software can convert speech to text, which makes direct transcription software possible. It is now possible to code sound segments, so as to make inferences from the pitch and tone of the sound as well (Fielding, 2002). Software compatibility also ensures that the best attributes of different

programmes can complement each other, since data may be transferred from one programme to another. One may therefore code in one programme, while compiling a conceptual map in another (Fielding, 2002). New analytic approaches are possible (Fielding; 2002), based on revolutionary sophisticated techniques (Lu & Shulman, 2008). Analysis that is not feasible by hand is made possible, such as linking multimedia and recoding consistently (Weitzman, 1999).

Considering these new developments, the under-utilisation of software features becomes a concern (Fielding, 2000), which also holds particular relevance for this thesis. Although many researchers have written about their experiences in using different software programmes, few specify how the programmes contributed to the enhancement of validity *per se*. Bourdon (2002) states that the software programmes are used as filing cabinets and that many features are unused, due to unfamiliarity with the software. As mentioned in chapter one, Seale (2002) conducted a survey investigating the use of CAQDAS features. According to his research, most users rarely use the advanced features that the programmes offer, such as conceptual mapping for building theoretical models, or proximity searches, which can aid hypothesis testing, by detecting whether one instance precedes or co-occurs with another. Another advanced feature rarely used is the introduction of inclusive file formats, such as text, audio and visual files.

In summary, it seems that, as a management tool, CAQDAS can aid all phases of the analysis process (Weitzman, 1999), from making notes in the field, transcribing field notes, editing, coding, storing, searching and retrieving data, to linking different types of data, making memos and displaying the data in an organised fashion. All this should arguably add to the quality of the report writing in the end. Notwithstanding the stated advantages associated with CAQDAS, when the above discussion is considered as a whole, the belief that the use of CAQDAS automatically confers credibility to qualitative research seems unrealistic (Gilbert, 2002). According to Gibbs *et al.*, (2002), qualitative analysis is rooted in interpretation. Computers cannot interpret and they are based on a quantitative worldview. Some analysts state that the use of

software improves the quality of the results; however, the computer cannot achieve this merit on its own, since it is only a tool for analysis:

The thinking, judging, deciding, interpreting, etc. are still done by the researcher. The computer does not make conceptual decisions, such as which words or themes are important to focus on, or which analytic step to take next. These intellectual tasks are still left entirely to the researcher. Even artificial intelligence cannot yet recognize the meaning of human language, especially as it changes according to context. Thus all the computer does is follow instructions regarding words, phrases, or text segments previously designated by the researcher as analysis units (Tesch 1991: 25).

In short, the analysis is only as good as the researcher; there is no substitute for thinking.

2.6 **Promises, Promises....: CAQDAS and validity**

"...the introduction of computers has been associated with renewed calls for rigour in qualitative analysis" (Dey, 1993: 57).

As the abovementioned quotation points out, some researchers have come to believe that CAQDAS provides them with the assurance and guarantee that there can indeed exist some union between qualitative data analysis and valid research results, as defined predominantly by a positivist approach. Bazeley (2008) stresses this notion of CAQDAS having an impact on the thoroughness, complexity and rigour of qualitative analysis, and St John and Johnson (2000) add to this viewpoint as well, by stating that the "...examination of data can be more complete and rigorous" with the use of CAQDAS (394). Mangabeira *et al.*, (2004) state that some CAQDAS users use "...technology and its associated symbolism of rigor and robustness to add an additional layer of credibility to their work" (170). Sandelowski (1995) even goes as far as to say that computers in qualitative research "...can serve further to legitimate the claims of qualitative researchers to be doing science by virtue of the common association of machine technology with science" (205). She (1995) further explains that:

Computer technology permits qualitative researchers to have computer printouts of data (with the veneer of objectivity they

confer) comparable to their quantitative counterparts whose claims to doing science are often not questioned. Even so-called soft data can become hard when produced by hardware. Qualitative work can now have the look and feel, or aesthetic features, of science. Its artistry can, therefore, more easily be denied (205).

Arguing in favour of CAQDAS, by stating that it relieves qualitative research in essence, from having to carry the label of being “unscientific”, presents a poor case; the computer has no power over the analysis process and purely acts as a research tool, and as LeCompte and Preissle (1993) affirm, “Computers, like scissors are tools. In themselves, they have no influence on the research process” (279). The computer can only do what it is instructed to do by the researcher. “However, whilst computer programmes can facilitate data analysis, making the process easier and arguably, more flexible, accurate and comprehensive, they do not confirm or deny the scientific value or quality of qualitative research, as they are merely instruments, as good or as bad as the researcher using them” (Burnard *et al.*, 2008: 430).

Nevertheless, although it is not argued here that CAQDAS undeniably ensures rigour, it may very well improve it, and several ways in which this is achieved will be considered. These promises will guide the investigation, so as to determine to what extent they were accomplished within the examined qualitative studies.

CAQDAS produces an easily accessible display of analytic procedures, in order to enhance transparency of the research conducted (Wickham & Woods, 2005). CAQDAS enhances transparency by explicitly visualising analytic strategies, structuring analysis, recording analytic progress by displaying the results of each instruction, creating an audit trail, saving all data (making it unlikely to be lost or overlooked), locating counter-evidence, (Kelle, 2004), displaying saved results and even additional information about the context can accompany extracted segments (Tallerico, 1991). CAQDAS can “...make the examination of qualitative data more complete and rigorous”, as well as produce findings that are “defensible, scientific and externally legitimised” (Lu & Shulman, 2008: 107). Qualitative studies are commonly presented without detailed descriptions of the entire research process, and as Fielding (2002)

states, "While analysing words is different from analysing numbers, this is not a warrant to be evasive or mystical about our analytic procedures" (172).

CAQDAS can, however, open an analysis up to independent inspection, public scrutiny and evaluation, in order to ensure consistency in analysis, which relates to overall validity (Boulton & Fitzpatrick, 1997; Cousins & McIntosh, 2005; Smit, 2005; St John & Johnson, 2000; Wolfe *et al.*, 1993), since "...these displays can be used by other investigators who wish to examine how inferences were made about data" (Conrad & Reinhartz, 1984: 6). CAQDAS support the researcher in maintaining an overview of the analytical steps, by displaying code words within their contexts with the retrieve function (Huber & Garcia, 1991). CAQDAS illustrates the context of the quotations, preventing the researcher from losing sight of the bigger picture (Dembkowski & Hanmer-Lloyd, 1995).

Webb (1999) argues that systematic analysis translates into objective, trustworthy and transparent analysis. The systematic execution of data analysis may be achieved with the use of CAQDAS, in terms of improving data processing and research efficiency (Cousins & McIntosh, 2005) and facilitating systematic computational research, by demonstrating explicit concrete steps (Dohan & Sanchez-Jankowski, 1998). Boulton and Fitzpatrick (1997) state that CAQDAS promotes a standard format of analysis; CAQDAS can standardise analytic procedures, which promotes analytic reflection (Bryman & Burgess, 1994).

Dey (1993) states that electronic developments and software can aid the double-checking of data by independent researchers, through reviewing how the interpretations are linked to the contextual data. Some software, such as NVivo and Coding Analysis Tool, can even track the work of different coders, in order to promote discussion and agreement (Bazeley, 2008). Therefore, CAQDAS can enable teamwork, by displaying analytic steps to open it up to reflexivity (Fielding, 2002) and promotes the working together of multiple researchers (Cousins & McIntosh, 2005). Software programmes promote the systematic exploration of data to promote agreement among researchers who

independently analysed data, hence enhancing rigour and trustworthiness (Welsh, 2002).

Another tempting promise is that CAQDAS effectively manages data, which will in turn aid the data analysis process. CAQDAS promises to remove constraints related to size, detail and complexity of analysis (Richards & Richards, 1994). With the computer "...the knowledge of the data is deeper, and the researcher is equipped for interrogating results in ways that were not possible in the filing cabinet" (Richards & Richards, 1994: 171). According to Conrad and Reinhartz (1984):

By taking over many of the mechanical aspects of qualitative analysis, the computer allows the researcher to devote more of his or her energy to the interpretive or analytic work, which is more significant and rewarding. This in itself has the potential for increasing the rigor and comprehensiveness of qualitative studies (9).

The lure of consistency in analysis promises to facilitate consistent coding (Gibbs *et al.*, 2002), aids systematic retrieval of data for comparative purposes (Wolfe *et al.*, 1993), as well as allowing the consistent inspection of index systems, the content of categories and relationship between categories (Richards & Richards, 1994). CAQDAS can also aid consistency of modification and editing capabilities (Bazeley, 2008), as well as consistent coding, by staying within the limits of each code and ensuring that no overlaps in meaning occur. All text that was interpreted with the same code can easily be retrieved and compared (Huber & Garcia, 1991).

Consistency in analysis is therefore associated with rigorous data analysis (Smit, 2005) and the retrieving function of new technology also promises to enhance rigour. "Facilitating the reliable and accurate return to the segments of original data that gave rise to theoretical notions eases the researcher's task of demonstrating to an audience of colleagues that what is proposed is a reasonable interpretation of the data" (Smith & Short, 2001: 407). The search functions promote the accuracy of the interrogation of data and electronic searches can rule out human error. With the search and retrieve functions, all material will be retrieved and segments are unlikely to be lost or overlooked (St John & Johnson, 2000). Furthermore, software increases accuracy, since it

is not prone to human error due to fatigue (Kondracki *et al.*, 2002). Having said that, manual scrutiny can pick up contextual derivations, synonyms and thematic ideas, which would not be identified by the computer (Welsh, 2002).

The data displays of CAQDAS lead researchers into believing that these can add to the validity of their findings. The results of qualitative analysis can be summarised in structured lists and tables (Wolfe *et al.*, 1993). Matrices (cross-tabulations of variables) can present frequency counts and communicate the researcher's analytic journey (Dembkowski & Hanmer-Lloyed, 1995), and Huber and Garcia (1991) argue that a matrix display may even strengthen the validity of interpretations, by exploring hypothetical relations. But do matrix displays in themselves enhance the credibility of findings? Data display can be defined as the "...organised assembly of information that permits conclusion drawing and action taking" (Miles & Huberman, 1984: 212). Miles and Huberman (1984) explain that the interpretations drawn from a matrix are only as good as the data of which they are comprised, but "In the course of our work, we have become convinced that better displays are a major avenue to valid qualitative analysis" (21).

In spite of all these benefits, some researchers are unconvinced of the analytical promises CAQDAS supposedly holds. For Seale (2002), the use of CAQDAS implies merely a promise of validity, when he states that, "One of the major potential advantages of CAQDAS is that the approach encourages (but does not enforce) rigor" (656) and "...although CAQDAS can enhance analytic rigor, this is not an inevitability" (657). Drisko (2004) similarly claims that not one software programme proposes an "...automatic enhancement to the rigor or meaningfulness of qualitative research" (193). CAQDAS cannot ensure the quality or rigour of analysis, since it is a tool for assisting with analysis. The central argument is that CAQDAS may improve, but does not guarantee rigour in coding and analysis (Bazeley, 2008).

2.7 **Summary**

Qualitative research is conceptualised from a constructivist and interpretative perspective, as opposed to quantitative research, which is understood within a relativist and positivist paradigm. The dominant conceptualisation of validity is based on a positivist discourse, which complicates matters for ensuring validity in qualitative research, as it is based on an entirely different meta-theoretical approach to knowledge production.

In this chapter, the relevance of validity in qualitative research was discussed in terms of the predominant debates on the issue, as well as by considering validation techniques that are, or at least should be, commonly employed in qualitative research. The introduction of CAQDAS in the 1980's gave rise to the hopeful assumption that these technological tools may enhance the validity of the qualitative research process. The benefits associated with a variety of the features of CAQDAS, and that fuel the promises of validity, may be summarised as follows:

Firstly, the display of analytic procedures, documents the analytic process through an audit trail, which contributes to the transparency of the process and to maintaining an overview of the analysis steps. Secondly, CAQDAS effectively manages data, which will in turn aid data analysis. CAQDAS as a management tool can index, store and retrieve data, make comments and annotations, and some programmes allow flexible editing features. Consistency in analysis and the performing of systematic analysis, considered vital for ensuring credible findings, are facilitated by CAQDAS through features such as the search functions that allow the consistent examination of data. Data can also be examined by independent researchers, in order to facilitate team-research. The data display features have the ability to create matrices, relational links and visual theory models, which allow new analytic approaches.

In the following chapter, the research methodology of the study will be discussed, to explain how the investigation was designed with an eye to determine whether CAQDAS had any effect on the validation of the examined qualitative research studies.

CHAPTER 3

Research design and methodology

3.1 Introduction

The central point of departure of this study is that CAQDAS, which is a research tool, is unable to make significant contributions in terms of enhancing the validity of qualitative research findings. Although the introduction of CAQDAS has greatly impacted on and improved the overall management procedures of the qualitative analytic process, it is argued here that CAQDAS cannot enhance the validity of research procedures by its own accord. Therefore, the key variables to be considered are the validation techniques employed by researchers, and whether these techniques are performed with or without the use of CAQDAS.

This chapter discusses the methodological paradigm within which the study was conducted, as well as its research design and methods employed for sampling, data collection and analysis, while explaining the rationale behind the choices made. Data processing and analysis is explained by firstly describing which parts of the scientific articles were focussed upon to best address the research questions. Secondly, it describes how the extracted data were captured and analysed. The chapter concludes with a discussion on how validity was enhanced in this study, as well as what its shortcomings are.

3.2 Research design

The research design of the study is that of a mainly descriptive content analysis of social artefacts as units of analysis, i.e. selected scientific articles that report on qualitative studies. The category of social artefacts is understood as the "...product of social beings or of their behaviour (cultural objects)" (Babbie & Mouton, 2001: 87).

According to Marshall and Rossman (2006), content analysis was historically used to obtain quantitative information about the content of text, but it evolved into a technique for describing and interpreting text. Therefore, a

distinction is made between quantitative and qualitative content analysis (Mouton, 2001). Quantitative content analysis aims to count the frequencies of categories, to summarise, rather than report in detail (Neuendorf, 2002), and to analyse the content of text, by isolating and quantifying the content of interest (Forcese & Richer, 1973). Qualitative content analysis, on the other hand, aims to interpret and describe, and is therefore relevant to all kinds of written text, as well as pictorial and sound materials (Manheim & Simon, 1977). In this study, content analysis of both a quantitative and qualitative nature is conducted, moving from mere quantification to description and interpretation, depending on the research question to be answered. The type of primary data that were collected and analysed, consists of text within documentary data sources, i.e., the scientific articles selected. This text may range from words to sentences, paragraphs or themes, depending on whichever data unit will best address the research question at hand (Holsti, 1969).

A benefit associated with this research design is that it is relatively economical in terms of both time and money (Williamson, Karp & Dalphin, 1977). In terms of validity, probably the most important benefit associated with the content analysis of archival or documentary sources is that it is unobtrusive in nature (Marshall & Rossman, 2006; Mouton, 2001; Williamson *et al.*, 1977). As products of human activities, documents such as scientific articles are unlikely to display reactivity to any marked degree. However, as Mouton (1996: 143) points out, the possibility of reactivity cannot be ignored:

It should nevertheless be borne in mind that the products of human behaviour are the result of decisions and cognitive processes. These products are the sedimentations or 'residues' of the human spirit (in Hegel's terminology). An example is manifested in the fact that when studying a text, the researcher has to be mindful of the original intention or aim of the author [...].

In this regard, it is important to keep in mind that authors of articles reporting on scientific, empirical studies aim to convince the reader of their scientific discoveries and, as Sismondo (2004) states, scientific articles may be viewed purely as arguments for a certain assertion. In a sense, these articles act as

rhetorical tools by means of which researchers “sell” their research to their peers and the public, by proclaiming its validity. The possibility that the present study will examine merely rhetorical tools, rather than the validation techniques that were actually employed, cannot be ignored, and is an issue that will be discussed further in section 3.6 below, as a potential shortcoming of the study.

Another potential danger inherent in content analysis involves the invalid construction of categories due to the inferential nature of the reasoning process (Babbie & Mouton, 2001; Marshall & Rossman, 2006). This threat can, however, be prevented, or at least minimised, by displaying the logic of one’s interpretation. In the present study, inferential biasing was controlled by basing the coding scheme on terms for validation techniques found in the relevant reviewed literature, as well as including illustrative quotations from the cases studied, in order to demonstrate to the reader the inferential reasoning underlying the coding scheme.

In terms of research design, the research is primarily cross-sectional in nature, although a longitudinal element is also included, in the form of an analysis of changes over time with regard to the most common type of CAQDAS utilised.

Finally, the meta-theoretical nature of the study will be considered. According to Babbie and Mouton (2001), meta-theory critically reflects on the quality and character of science, by examining how it operates in practice in research as to make science more “socially responsible” (13). Meta-theory intends to “...make sense of science, to contribute to a more informed practice, and to make contributions which might lead to a better science” (14).

3.3 **Population, sampling and data collection**

The researcher aimed to collect data from an as large as possible proportion of the total theoretical population of the body of scientific literature that describes qualitative research and makes reference to how validity was enhanced, at least in part, with the use of CAQDAS. The decision for these selection criteria was based on the need to address the question of whether CAQDAS has any

effect on validating qualitative research. Purposive sampling, which is based on the researcher's judgements of which cases will best satisfy the needs of the project, was employed (Robson, 1993). The goal of this essentially non-random sampling technique is "...selecting all textual units that contribute to answering given research questions" (Krippendorff, 2004: 119). The study population of data sources includes articles that were identified by means of online searches of bibliographic databases and search engines, using the keywords "qualitative data analysis", "validity", "CAQDAS" or "qualitative data analysis software".

Although no explicit time limit was set on the publication dates of the articles to be included for analysis, the study population consists only of those articles published in journals that are included in the databases provided by the Stellenbosch University (J.S. Gericke) Library, and in journals and issues of journals that are available in South Africa. Relevant databases include the following: *Academic Search Premier/EBSCO Host*, *ISI Web of Science*, *JSTOR*, *PROQuest*, *SAePublications*, *Science Direct*, *Emerald*, *Social Work Abstracts*, *Academic One File*, *Biomed Central* and *Pubmed Central*. Search engines such as *Google Scholar* and *Scirus* were also employed to identify relevant articles. The bibliographic search was limited to peer-reviewed articles, to ensure that the quality of the articles is, at least to some extent, comparable. Unfortunately, the selection of only peer-reviewed articles was not always possible for all databases, since some do not provide that option, but fortunately, the databases available from the Stellenbosch University Library are valued for their academic integrity, and it may therefore be argued that the journals meet a similar, relatively high academic standard in terms of the quality of their content. In cases where articles were not directly available from the J.S. Gericke Library, they were requested from another university library, through the inter-lending facility.

A pilot study was first conducted to determine the feasibility of the study, as well as to establish what data analysis procedures would be most relevant and appropriate for the type of data available. The pilot study focussed specifically on the validation techniques employed and on examining which are performed

with and without the use of CAQDAS. This process offered insight into the types of techniques and the terminology associated with them, which was helpful during the coding process. A total of 20 techniques were identified in thirty-two articles examined in the pilot study. These techniques were further categorised as being performed with or without CAQDAS and it was found that most of the procedures could have been executed without the use of CAQDAS. The coding scheme that emerged from the pilot study was less refined than the final coding scheme used in the actual study; for example, the code "reflection" included field notes, journals and the review of analysis consistency.

It became evident during the pilot study that some techniques are only mentioned very briefly by the authors, merely to explain the research procedures followed. It was therefore decided that only validation techniques that are recognised by the authors *as validation procedures* would be included as data in the actual study. Validation techniques were included on the basis that they are either explicitly discussed in a section of the article, or implied by words such as "control bias", "scrutinize", "check", "allow rigorous examination", "verify", "verification", "ensure adequacy", and "re-examine for congruence with original data". The pilot study also alerted the researcher to the fact that validation techniques at all research stages should be considered, rather than focussing on the data analysis phase only, in order to produce a comprehensive indication of the types of techniques employed in qualitative studies. Other validation techniques that are applied even before the actual data analysis phase include the following: the review of transcripts for accuracy, following an interview protocol and matching interviewer and interviewee characteristics, in order to combat social desirability bias.

The data were collected over a period of six months. Only qualitative studies were included; no mixed method studies were considered, in order to ensure a sample that would be more homogeneous in this regard. The justification for the exclusion of mixed method studies is based on the focus of the study, i.e., on how qualitative studies *in particular* are validated. The inclusion of mixed methods, which suggest a form of triangulation of quantitative and qualitative

methods and data, would have detracted from this focus. The final sample consists of 108 scientific articles, which were each treated as a case. As previously stated, no time limit was set prior to the search on the publication dates of the articles to be included, but as no articles prior to 1996 met the selection criteria, the publication dates of the selected articles range between 1996-2009.

Keeping sufficient record of all the collected data, a process described in more detail in the following section (3.4), minimised possible sources of error, such as omitting relevant information, or losing it all together. Bibliographical information of each article, including its title, author(s), source journal and publication date, is recorded in Appendix A of the thesis. The recording of the bibliographical information produced a database, which allowed searches in the manual and electronic filing system, in order to retrieve, where necessary, relevant information for double checks and reviewing accuracy.

3.4 **Data processing and analysis**

The data processing and analysis were conducted over a period of three months. The relevant variables are the CAQDAS programmes used (to determine which is most commonly employed), the publication dates of the articles (to investigate trends over time in CAQDAS use) the types of validation techniques applied, and whether these were applied with or without the use of CAQDAS. All data were initially recorded in Microsoft Office Excel. Thereafter, data on the relevant variables, which address the three main research questions described in section 1.4, were exported to SPSS Statistics v.17.

Firstly, frequency counts were performed on the variable "CAQDAS programmes used", in order to determine which programmes were most commonly employed. The results are displayed in a table. Changes in the frequency of software programme use over time were then determined by means of frequency counts on the publication date variable, and the results are also displayed in a table. The validation techniques employed, and whether each was performed with the use of CAQDAS or not, were recorded as categories of two separate variables in SPSS. The validation techniques

employed were coded by means of inductive reasoning, which allowed for coding categories to emerge from the data. The coding that was applied was based on the terminology as it appeared in the articles and in the reviewed methodological literature.

The summarising and reduction of the data on validation techniques could then commence, in order to present the results in a comprehensible manner to the reader (Krippendorff, 2004). Atlas.ti (Student Demo Version 5.2) was used to facilitate the refinement of the codes and to create code families. The code families were created on the basis of thematic relations among the codes. For example, the code family "reflection" includes codes such as awareness of personal biases, reflexive journal, reflexive memos, reflexive notes, team-based discussion and thick descriptions. This coding process will be discussed in more detail in the following chapter. Atlas.ti was employed on account of its ability to provide the user with a clear overview of the presented data and to simplify the management involved in grouping of differing codes. Finally, in SPSS, the validation techniques performed were cross-tabulated by indicating whether CAQDAS was used, in order to determine which techniques are conducted in a primarily manual manner, and which are generally performed electronically.

3.5 **Validity issues**

As already mentioned in section 3.2 above, the fact that non-reactive, documentary data sources were used, strengthens the validity of the data. Validity was further enhanced in this study, by allowing the investigation to be guided by the literature review. The reviewed literature provided an in-depth understanding of how qualitative research is predominantly validated, on the basis of which articles could be examined and data analysed. Reviewing the data twice in order to examine whether any validation techniques were overlooked or misinterpreted, as well as revising the coding scheme and refining it, also adds to the credibility of the findings. Reflective handwritten notes made during data examination were consulted during the writing-up phase, in order to refresh the researcher's memory in terms of concerns and

relevant issues that arose during the research process. Direct quotations from the articles serve to illustrate and provide evidence in support of the findings and interpretations presented in the following chapter. Finally, the inclusion of all data sources in Appendix A renders the study transparent and open to critical evaluation. However, in order to comply with ethical standards of confidentiality, the articles are not listed according to the case numbers according to which articles are referred to in this thesis.

3.6 **Shortcomings of the study**

One of the most important limitations of this study concerns the selection of the data. Although the aim was to collect as large as possible a proportion of the total target population of the body of scientific literature that describes qualitative research and makes reference to how validity was enhanced with the use of CAQDAS, some factors beyond the control of the researcher did place constraints on the articles that were eventually selected. Practical considerations, such as the availability of the literature, as well as the time available for data collection, played a defining role in the selection process. As mentioned above, the data were collected by making use of the databases provided by the Stellenbosch University (J.S. Gericke) Library and in journals and their issues that are available in South Africa, as well as by utilising the search engines *Google Scholar* and *Scirus*. Therefore, literature that meets the selection criteria (qualitative research that makes reference to how validity was enhanced with the use of CAQDAS), but is not listed within these search engines and databases, would not have been included in the study. However, the researcher does not believe that this biased the results in any way, since the selected articles are of a comparable academic quality and are probably representative of the target population of scientific articles, thereby ensuring the fittingness of the results.

A second, related sampling limitation is associated with the number and type of keywords searched, i.e., “qualitative data analysis”, “validity”, “CAQDAS” and “qualitative data software”. Other keywords, such as “open source” or “qualitative research tool”, may have elicited articles describing qualitative

studies that used less commercial programmes. Also, many qualitative researchers do not use the term "validity", since they perceive it as more appropriate in the quantitative paradigm. Therefore, including only validity as a keyword, and not other, related terms such as "rigour", "trustworthiness", "control bias", and "checks", may have excluded the work of such researchers from the sample.

A third limitation of this study flows from its use of the rhetorical tools of scientific writing as its data source. As mentioned earlier in this chapter, authors of articles reporting on scientific, empirical studies aim to convince the reader of particularly the validity of their scientific contributions through rhetorical tools. It may be that, in reality, it is not the validation techniques *per se* that are examined in this study, but rather their rhetorically mediated representations - the "hard selling" techniques authors employ in order to make their research credible. Another, related, limitation is the fact that the interpretations of this study are only based on the information that is provided by the researchers (authors of the articles). For example, a researcher may have used CAQDAS, but neglects, for various reasons, to report on its use in the article describing the research, ultimately rendering the research article as an incomplete or even inaccurate representation of the research process.

3.7 **Summary**

The research design employed in the present study is that of a descriptive content analysis. The aim is to focus on scientific articles that not only report qualitative studies, but also make explicit reference to the use of CAQDAS, and describe validation techniques applied during the research process. The research design and selection criteria were chosen, based on the belief that they are appropriate for answering the research question: what are the validation techniques employed in the examined studies and to what extent are they performed with the use of CAQDAS? A descriptive content analysis will allow the researcher to focus on the key variables (the validation techniques employed by researchers and whether these techniques are performed with or

without the use of CAQDAS), in order to determine the necessity of CAQDAS in this regard.

After a pilot study was conducted to determine the feasibility of the study, the actual study commenced. Purposive sampling was applied to select a sample from the target population of scientific articles: scientific literature that describes qualitative research and makes reference to the use of CAQDAS, as well as how validity was enhanced. Articles meeting these criteria were identified through online searches of bibliographic databases and search engines, using certain keywords. The resulting sample consists of 108 articles, published from 1996 to 2009.

Data collection first entailed capturing the names of the CAQDAS programmes used and the publication dates of the articles, in order to address the first and second research questions, i.e., what are the most commonly used software programmes and are there any trends over time with regards to software use in general? The main research question (what are the predominant validation techniques applied and are they performed with or without the use of CAQDAS?), is answered by capturing data on the validation techniques applied, and specifying, in each case, whether they were performed with or without the use of CAQDAS. All data were first recorded in Microsoft Office Excel and then exported to SPSS Statistics v.17, to produce frequency counts as well as perform cross-tabulations.

In the present study, validity issues are addressed, by allowing the investigation to be guided by the reviewed literature, reviewing the data twice, reflecting on notes, including illustrative quotations in the findings, as well as including the relevant bibliographical information on the selected data sources in an appendix. One possible limitation of the study relates to the selection of data sources, since the sample of articles was not selected from the entire population of scientific literature. Another worrying factor is the notion that authors aim to convince readers of the validity of their scientific findings through the rhetorical tools of scientific writing. This has implications for the present study, since it is possible that rhetoric was examined, instead of the actual verification process. Also, the researcher could only interpret what was

reported in the articles. As discussed in chapters one and two, there exists a tendency among qualitative researchers to omit detailed descriptions of the research process they followed. Therefore, the findings of this thesis are based on the limited and partially reported information provided by the authors of the articles. These findings will be presented and discussed in the following chapter.

CHAPTER 4

Results and Discussion

4.1 **Introduction**

This chapter addresses the research questions stated in chapter 3. The chapter commences with a description of the sample profile and then addresses the research questions, by presenting the results of the analysed data in tables, followed by a discussion of the findings. First, the different software packages used, as reported in the sample of research articles, are listed and a brief overview of their main capabilities considered. The three most commonly used packages are discussed in more detail, while also considering their developmental history. Secondly, software trends are demonstrated with reference to (1) an increase in CAQDAS use in general in the past thirteen years, as well as (2) the type of programmes reportedly used most frequently at different points in time. Finally, in order to answer the central research question of the study, the validation techniques referred to in the research articles are presented, accompanied by a table demonstrating whether they were employed with the use of CAQDAS, or not. These validation techniques are discussed in terms of what they entail and how they reportedly aim to validate the research. Where relevant, quotations directly drawn from the research articles are included to illustrate the findings.

4.2 **Sample profile**

The study sample consists of 108 research articles. The journals in which the articles appear, as an indication of the research fields covered, were categorised according to subject area and ranked in descending frequency of articles in each category. Table 1 indicates that most (more than a third) of the articles were sourced from medical journals (including nursing, nutrition,

pharmaceutics, speech-therapy and medical ethics), with social science journals (psychology, sociology and social work) a close second with 31 per cent of the articles. Thirteen per cent of the articles were located in business management and economics journals (including ergonomics, marketing and programme evaluation), while the remainder represent the fields of education and development (8%); leisure, sport and exercise (5%); information science and library studies (4%) and lastly, at a mere 2 per cent of articles, natural sciences and engineering.

Table 1: Distribution of articles across different types of journals

Type of journal	Number of articles	Percentage of articles
Medical journals	40	37
Social science journals	34	31
Business management and economics	14	13
Education and development	9	8
Leisure, sport and exercise	5	5
Information science and library studies	4	4
Natural sciences and engineering	2	2
Total	108	100

The publication dates of the research articles, and therefore the time span covered by the study, range from 1996-2009. The number of research articles per year is presented in Table 2:

Table 2: Distribution of articles across publication dates, 1996-2009

Publication date	Number of articles
1996	1
1997	2
1999	2
2000	6
2001	5
2002	6
2003	6
2004	10
2005	12
2006	18
2007	18
2008	14
2009	8
Total	108

As Table 2 shows, there has been a steady increase in the examined sample, from only 1 article in 1996 that describe qualitative research and make reference to how validity was enhanced, at least in part, with the use of CAQDAS, to 18 articles 10 years later. This seems to indicate that there has been an increase in the use of CAQDAS, at least as reported in the research articles over the past 13 years.

4.3 **Software programmes and their capabilities**

Barry (1998) warns that software programmes, as well as their versions chosen by researchers, vary in terms of their capabilities, and therefore ultimately have different effects on the analysis process. In Table 3, the different software programmes used by researchers (defined as the authors of the sampled articles), are presented and categorised in terms of their main capability. Initially, a total of 113 cases were included in this analysis, due to the fact that in three research articles more than one software programme was employed for the purpose of analysis.¹ In some instances, derivatives or differing versions of the same programme were grouped together during the coding process (e.g., NUD.IST, NVivo, N4, N5, and N6 are collectively coded as QSR N, and winMAX and MAXqda are coded as MAXqda).

Furthermore, in six cases the author/s mentioned that CAQDAS was employed for analysis purposes, but did not specify which programme in particular. The data on these cases are treated as missing and are not considered in the following table, which therefore presents the data for a total of 107 cases:

¹ In the first instance, NUD.IST was used in conjunction with NVivo. In the second instance, NVivo was used together with NUD.IST and Text.Stat, and in the final instance, CI-said was used together with NVivo and QDA-Miner.

Table 3: Frequency distribution of software programmes used

Main capability	Software Programme	Frequency	Percent
Code-based theory builders	QSR N	64	59.8
	Atlas.ti	34	31.8
	MAXqda	3	2.8
Code-and-retrieve	HyperResearch	2	1.9
	Ethnograph	1	.9
Combine qualitative data with numerical information	CI-Said	1	.9
	QDA Miner	1	.9
	TextStat	1	.9
Total		107	99.9²

It is evident from the table that the QSR N programmes (at approximately 60%) were most often utilized, followed by Atlas.ti (31.8%), with MAXqda (2.8%) in third place. As discussed in the literature review, these programmes all share the feature of being code-based theory builders. A similar type of programme, but one which is much less commonly used (in less than 2% of the cases), is HyperResearch, which uses a case-based approach to code transcriptions and the building of theories. Earlier versions of this code-and-retrieve programme allowed the exact blocking of text for coding purposes and also the manipulation of codes. It performed Boolean searches only and was not able to make memos (Drisko, 1998). The newest version, HyperResearch 2.8.1, was launched in April 2009, and has new multimedia capabilities, facilitating the coding of text, graphic, audio or video files (<http://www.researchware.com>). Another primarily code-and-retrieve programme, also in the minority with less than 1% representation, is Ethnograph. The fact that this software programme has not been updated

² Due to rounding off of percentages, they do not add to 100.

since 1998, probably explains its low frequency of use. Ethnograph can, however, aid hierarchical coding, make text annotations and its search strategies were considered very advanced for its time (CAQDAS New Media Methods, n.d.).

The next three programmes that will be briefly considered are all based on a quantitative approach, since they combine qualitative data with numerical data. Research designs that are based on a qualitative research paradigm, but that have a quantitative orientation, such as content analysis, are greatly assisted by such programmes (<http://www.code-a-text.co.uk/cisaid.htm>). As can be noted in Table 3, these programmes are each used in only one case, which translates into a very low (0.9%) occurrence rate. First to be considered is TextSTAT, which is described as a "...simple programme for the analysis of text" that can search text as well as create word frequency lists (<http://www.niederlandistik.fu-berlin.de/textstat/software-en.html>). Secondly, QDA Miner, created in 2004, is able to code textual data, make annotations and retrieve text. It facilitates mixed method approaches, by combining the textual data with numerical and categorical data for statistical analysis (CAQDAS networking project, n.d.; CAQDAS New Media Methods, n.d.; <http://www.kovcomp.co.uk/QDAMiner/index.html>). The last programme in this category, CI-Said, also facilitates open-ended coding for textual data, which can be combined with categorical and numerical rating scales. The output is generated in the form of reports, charts or tables (<http://www.code-a-text.co.uk/cisaid.htm>).

The features of the most commonly used package, QSR N, which includes NUD.IST, NVivo, N4, N5, and N6, will now be considered in more detail. The software package NUD.IST was developed in 1981 and the QSR company, which was established in 1995, is now the largest privately owned qualitative research software developer in the world (<http://www.qsrinternational.com>). NUD.IST, the acronym for Non-numerical Unstructured Data Indexing, Searching and Theorizing (Richards & Richards, 1991a), was developed by Tom Richards, a computer scientist, and Lyn Richards, a qualitative researcher (Weitzman & Miles, 1995). NUD.IST has three operating systems: a document

system for processing documents, an indexing system responsible for the indexing of data and for building the data into a database, and finally, an analysis system for manipulating the database (Richards & Richards, 1991a). The aim of the programme is to facilitate theory building through code patterns and relationship building of hierarchical codes (Prein, Kelle & Bird, 1995). The indexing system is graphically displayed and illustrates the indexing in a tree and branch format. 'Nodes', referred to as the "points where sub-codes branch out from a higher level category" (Drisko, 1998: 14), represent coded text or relationships.

In addition to these facilities, the user of NUD.IST can make memos, count code frequencies, build matrices and auto code text according to specified keywords (Prein *et al.*, 1995). The user is not able to select text of free form lengths for coding purposes, since lines, sentences or paragraphs are marked in their totality, thereby including potentially irrelevant parts of the text. Applying multiple codes to one segment and allowing revisions and editing can compensate for the former drawback (Drisko, 1998). Proximity, sequential and some Boolean operators could facilitate the search and retrieve functions, but no hypertext facilities exist, although links can be made between memos and codes, as well as between memos and text documents (Drisko, 1998; Prein *et al.*, 1995; Weitzman & Miles, 1995).

Compared to other programmes (at the time of its early development), NUD.IST had the widest set of search features of software programmes (Drisko, 1998). QSR N4, N5 and N6 are all derivatives of NUD.IST, but NVivo, which is the updated version, was launched in May 1999 (Ozkan, 2004). Welsh (2002) describes NVivo as a programme that is simple to use, and enables the user to import documents from word processing packages, code the text onscreen in the margins, make memos and create diagrams of theme relations with the model explorer tool. Features can be cut, copied, shifted or even merged (Bazeley & Richards, 2000). The user is able to code text in varying options: free nodes (as they are called in the programme) refer to nodes that are not categorised, tree nodes are hierarchical codes and case nodes are

categorized (Ozkan, 2004). Word processing documents can also be presented in a database, so as to allow inspection of all the accompanying descriptions.

The latest version, NVivo 8, was launched in March 2008 and facilitates the processing of multimedia data files, such as text, video, digital photos, podcasts and music/audio files (CAQDAS networking project, n.d.; <http://www.qsrinternational.com>). Furthermore, its output can be created in the form of charts to be exported to other programmes, and it facilitates team research, through the merging of separate projects and the sharing findings in HTML web pages. This allows a comparative examination of the analysis work of each member on a research team. The percentage of agreement across different users' work can even be established (<http://www.qsrinternational.com>).

The second most commonly used software programme in the sample is Atlas.ti: developed by Thomas Muhr (Prein *et al.*, 1995), with the latest version, Atlas.ti 6, launched in April 2009 (CAQDAS networking project, n.d.). The overall project file, is named the Hermeneutic Unit (HU), and the HU editor displays the text of the selected document, a list of other documents ("Primary Texts"), lists of codes, memos etc. (Weitzman & Miles, 1995). The user-friendliness of the programme is enhanced with icons in the toolbar, for the most predominant actions (Weitzman & Miles, 1995). Earlier versions of this software did offer fewer searching capabilities than, for example, NUD.IST, but it was a strong contender among CAQDAS, due to its unique ability to create code families and the graphical illustration of directional links and relationships on vertical and horizontal levels (Drisko, 1998). Furthermore, Drisko (1998: 9) notes that it is "extremely versatile" in making memos and linking them to codes, text or other memos.

Atlas.ti facilitates independent coding, making memos and theory building and the sharing of the results, thereby facilitating multi-authoring (Muhr, 1991; Prein *et al.*, 1995). Further support for multiple authors is made possible with the 'log-in' function, which allows one to distinguish between what work is 'mine' and 'not mine' (Weitzman & Miles, 1995). For theory development, graphic networks display linkages between codes, documents, text segments

and memos and can be directional (causal), or non-directional (Babbie & Mouton, 2001; Muhr, 1991; Prein *et al.*, 1995). Hypertext functions can either be based on a star structure, where all of the linked elements relate to an original source, or a chain structure, where elements flow from one another consecutively (Babbie & Mouton, 2001). Furthermore, codes can have numerical values, which allow them to be exported to SPSS (Babbie & Mouton, 2001; Prein *et al.*, 1995). The length of coded text can be changed at any point and one segment can have multiple codes attached to it. The codes can also be grouped into hierarchical relations, called family codes (Babbie & Mouton, 2001; Muhr, 1991). Codes can also be merged, edited or filtered, as to selectively display certain elements (Drisko, 1998; Weitzman & Miles, 1995). The retrieval function makes a list of texts, codes and memos visible (Babbie & Mouton, 2001), as well as a list of associated quotes of each code with reference numbering of the document and line numbers (Weitzman & Miles, 1995). Boolean, proximity and semantic searches are all supported by this programme (Babbie & Mouton, 2001; Prein *et al.*, 1995). The latest version of Atlas.ti offers a Google Earth™ feature, facilitating geo-referencing (CAQDAS networking project, n.d.).

The third most commonly used programme in the sample is MAXqda. In 1989, the first version of this package, MAX, was developed and it was only available in an English version from 1995. Today the programme is available in German, English, Italian, Spanish, French and Japanese. Another new version, winMAX, was created in 1994 and a package with improved visualization functions, by applying codes in the text margins, saw the light in 1997. The 1994 version was not suited for grounded theory analysis, as Atlas.ti and NUD.IST are, due to the fact that it had limited search operators (it could only process "AND" and "OR"), and due to it being a database programme, which listed documents, with all relevant additional numerical information, codes, line numbers, etc. (Weitzman & Miles, 1995). It did, however, support narrative data, as well as numerical data and frequency counts of codes, and the numerical data could be exported to statistical packages (Prein *et al.*, 1995).

Furthermore, it facilitated the graphical display of hierarchical relations among codes (Prein *et al.*, 1995).

The software package as it is known today, MAXqda, was created in 2001, and in 2008 the improved version was even able to integrate geo-references into text analysis; linking any location in Google Earth™ to the text or to codes (<http://www.maxqda.com>). With regards to data management, texts are editable in the programme, coloured codes can be attached, memos can be attached, an overview can be selected of all codes and memos, and multiple and overlapping codes can be managed. Team research is facilitated by the option to merge projects or even by importing and exporting codes and memos from other members' files, and by the 'log-in' author manager, which personalises each team member's file. Graphic tools include a code matrix, cross tables for comparing differing codes and a text comparison chart (<http://www.maxqda.com>).

4.4 **CAQDAS trends over time**

As reported in section 4.2 above, in general, there seems to have been an increase in the use of CAQDAS, as reported in the research literature over the past 13 years. The growth in CAQDAS use may be attributed to a rising awareness of these programmes due to marketing campaigns and expanding accessibility through free downloads, online customer support, tutorials, manuals and even quick tours that are available on the websites of the packages. In this section, trends in the use of different CAQDAS programmes over a period of 13 years (1996 to 2009) will be considered.

Table 4: Trends of CAQDAS use from 1996-2009

Publication date	Software programme	Number of use	Subtotal of reported articles
1996	HyperResearch	1	1
1997	Ethnograph	1	1
1999	NUD.IST	2	2
2000	Atlas.ti	2	5
	NUD.IST	3	
2001	Atlas.ti	2	5
	N4	1	
	NUD.IST	2	
2002	Atlas.ti	2	5
	N4	1	
	NUD.IST	1	
	N.Vivo	1	
2003	Atlas.ti	1	5
	N4	2	
	NUD.IST	2	
2004	Atlas.ti	3	10
	N5	1	
	NUD.IST	3	
	NVivo	3	
2005	Atlas.ti	9	12
	HyperResearch	1	
	NUD.IST	1	
	winMAX	1	
2006	Atlas.ti	5	18
	MAXqda	1	
	N5	2	
	N6	1	
	NUD.IST	5	
	N.Vivo	3	
	N.Vivo 2.0	1	

Table 4: Trends of CAQDAS use from 1996-2009 (cont.)

2007	Atlas.ti	4	22
	CI-Said	1	
	MAXqda	1	
	N4	1	
	NUD.IST	3	
	NVivo	6	
	NVivo 2.0	3	
	NVivo 7	1	
	QDA Miner	1	
	TextStat	1	
2008	Atlas.ti	3	14
	N4	1	
	N5	1	
	N6	1	
	NUD.IST	1	
	NVivo	5	
	NVivo 2.0	1	
	NVivo 7	1	
2009	Atlas.ti	2	7
	Atlas.ti 5.0	1	
	N6	1	
	NVivo	3	
TOTAL			107³

It is evident that during the years from 1996-1999, the programmes HyperResearch, Ethnograph and NUD.IST were more commonly used. From 2000 to 2004, only the programmes Atlas.ti, NUD.IST, N4, N5 and NVivo were reported. In the period 2005-2007 a wider range of programmes were used, with Atlas.ti, HyperResearch, NUD.IST, win.MAX, MAX.qda, NVivo, N5, N6, TextStat, QDA-Miner and CI-Said reported in research articles. From 2008-2009 those programmes that dominate in general, i.e., Atlas.ti, NUD.IST,

³ Although the use of 113 software programmes are reported in the 108 sampled articles, a total of 107 is obtained, due to the fact that in 6 articles the types of software programmes were not specified, rendering the data as missing values.

NVivo, N4, N5 and N6, are prevalent once more. In the above analyses, distinctions are drawn between different versions of the programmes, for NVivo 2.0 and 7 as well as for Atlas.ti 5.0. Many of the authors did not specify the version of the programmes used, but programmes such as MAXqda is a later version of winMAX and NVivo and N4, N5 and N6 are updated versions of the original NUD.IST. What is interesting, or rather quite alarming, is the relatively high incidence of use of 'outdated' programmes, when newer versions had been available for quite some time (even if the time lag between research and publication is taken into consideration). For example, a programme such as NUD.IST was used in research reported in an article published as recently as 2008 and the programme winMAX, updated to MAXqda in 2001, was used in research reported in an article in 2005. One may argue that outdated packages are unable to compete with the technologically advanced programmes of today, and their users miss out on the opportunity of conducting analyses that are potentially much more complex on both a conceptual and interpretative level.

4.5 **Validation techniques**

This section will answer the main research question, by showing which validation techniques are predominantly employed in qualitative studies. Furthermore, in order to determine the necessity or redundancy of CAQDAS as a validation tool, it is demonstrated whether the validation techniques are performed with or without the use of CAQDAS.

The validation techniques employed, and whether each was performed with the use of CAQDAS, was recorded as categories of two separate variables in SPSS in order to produce a cross-tabulation of the data. The validation techniques were inductively coded based on terminology as they appeared in the articles and in the reviewed methodological literature.

Table 5: Validation techniques grouped according to relational categories

Group	Validation technique	CAQDAS use		Total	Percent
		Without	With		
Theory	Categorise on previously identified constructs or coding guide	3	0	3	0.7
	Referential adequacy	3	0	3	0.7
	Replication logic	2	0	2	0.4
	Sampling: Purposive/Theoretical & Quota	12	0	12	2.7
	Theoretical consistency	5	1	6	1.3
	Subtotal	25	1	26	5.8
Searching	Accurate recording and retrieval	0	6	6	1.3
	Consistent examination & Accurate searching	0	3	3	0.7
	Cross-case comparisons	1	6	7	1.5
	Review/revise coding	8	10	18	4
	Systematic/standardized/automated coding	0	6	6	1.3
	Subtotal	9	31	40	8.8
Standard procedures	Standard analysis procedures	6	5	11	2.4
	Subtotal	6	5	11	2.4
Data display	Audit trail	7	8	15	3.3
	Frequency counts	0	10	10	2.2
	Matrix display	1	6	7	1.5
	Pattern detection/matching	0	4	4	0.9
	Visual relationship building	0	7	7	1.5
	Subtotal	8	35	43	9.4

Table 5: Validation techniques grouped according to relational categories (cont.)

Checks	Audiotape data collection sessions for clarification	2	0	2	0.4
	Back-and-forth cross examination	4	7	11	2.4
	External peer review	33	6	39	8.6
	Illustrative quotations and In vivo coding	11	9	20	4.4
	Impartial experienced coders	2	1	3	0.7
	Member checks	44	0	44	9.7
	Multiple coders/analysers	19	33	52	11.5
	Preparation of transcriptions/responses	27	0	27	6
	Repeating analysis	2	3	5	1.1
	Triangulation	38	6	44	9.7
	Subtotal	182	65	247	54.5
Reflection	Consider alt explanations and negative cases	3	7	10	2.2
	Reflexivity	29	6	35	7.7
	Summary of interpretations/decisions	1	1	2	0.4
	Team-based review/discussion	8	0	8	1.8
	Thick description	1	1	2	0.4
	Write field notes prior to coding	2	0	2	0.4
	Subtotal	44	15	59	12.9
Field procedures	Anonymity and confidentiality	2	0	2	0.4
	Interview protocol/script/discussion guide	4	0	4	0.9
	No incentives	2	0	2	0.4
	Open-ended/neutral questioning	2	0	2	0.4
	Persistent observation	5	0	5	1.1
	Prolonged engagement in the field	7	0	7	1.5
	Subtotal	22	0	22	4.7
Other	Other	4	0	4	0.9
	Subtotal	4	0	4	0.9
	Total	300	152	452	99.4⁴

⁴ Due to rounding off of percentages, they do not add to 100.

This table shows that of the 452 validation checks performed in the 108 cases, only 152, or 34%, were performed with the use of CAQDAS. The validation techniques were grouped into categories created on the basis of thematic relations among the codes (theory, searching, standard procedures, data display, checks, reflection, field procedures, and other) and will now be explained and discussed in that order.

4.5.1 Theory

The validation techniques grouped under the term 'theory' are based on how the choice of theoretical considerations of the research design, methodologies, theoretical paradigms, as well as reviewed literature, have an influence on the validity of the research. These validation techniques were mentioned in twenty-six instances, but the use of CAQDAS was only reported once.

4.5.1.1 Purposive and quota sampling

Purposive or theoretical sampling is the selection of participants who will best satisfy the study in terms of its purpose (Babbie & Mouton, 2001). Such purposive sampling techniques, as well as sampling restrictions, were used in eleven cases (all without the use of CAQDAS) to enhance validity and rigour (Seale & Silverman, 1997). The following case illustrates the use of sampling restrictions:

"An average of only 1.8 referrals from any one woman was used in order to avoid over-enmeshment of the sample with like-minded groups" (Case 75: 450).

This type of sampling technique will ensure the heterogeneous sample needed to maximise content validity. The theoretical base of this sampling technique controls for biasing effects that pose a great danger in convenience samples. Furthermore, the application of sampling restrictions can control extraneous variation. It becomes a verification strategy when participants who best represent phenomena under study, or who have knowledge of the investigated topic, are selected in order to promote efficient saturation (Morse *et al.*, 2002). Statistical generalisability is not relevant in qualitative research, but with purposive sampling a diverse sample with a wide range of variation, including

deviant cases, can be assembled, and will increase representativeness, thereby maximising the external validity of findings (Mays & Pope, 1995).

Quota sampling is aimed at the selection of a representative sample, by applying a relative proportion principle to participants with certain characteristics, and selecting the individuals with the characteristics under investigation. Once more, this can enhance external validity (also known as transferability in qualitative research) of the findings. The following quotation illustrates how this sampling technique operates and what it aims to achieve:

"Quota sampling was used to [...] ensure approximately equal numbers of African American, Puerto Rican, and White women as well as approximately equal numbers of women from each disease stage (i.e., asymptomatic, symptomatic, and AIDS) within each ethnic/racial group" (Case 98: 269).

4.5.1.2 Replication logic

This technique aims to improve the external validity, or rather transferability, of the research findings. Replication logic, as explained in the cases investigated, seeks to make predictions about the research outcome. It is implemented by selecting cases or participants who initially demonstrate very similar or dissimilar characteristics, thereby achieving either similar or dissimilar results.

4.5.1.3 Referential adequacy

Referential adequacy, reported in three cases, refers to the drawing of comparisons between the interpreted themes and theory in the literature, in order to assess the content validity, as well as internal validity, of the research concepts under investigation and, ultimately, the research findings (Kidd & Parshall, 2000). This technique involves cross-validating interpretations and findings with reports and results from other studies, and by integrating literature in the formulation of conclusions.

4.5.1.4 Categorise on previously identified constructs or coding guide

Although closely related to the principle of referential adequacy, this technique is performed not by referring to others, but rather by basing interpretations on

one's own, previously established and well-defined theoretical concepts. In the three cases that reported the use of this technique, it is applied to combat confirmation bias, in order to minimise subjective interpretations. Confirmation bias, also known as experimenter expectancy, is when the researcher only perceives what s/he expects to notice, by influencing the responses of participants, selecting certain sections of data and interpreting data in a way that would support a given hypothesis (Graziano & Raulin, 2004).

4.5.1.5 Theoretical consistency

Morse *et al.*, (2002) explain theoretical consistency as methodological coherence between all research elements, i.e. all the building blocks that the research process is based upon. The research question should guide the choice of the appropriate research design, by determining whether it would be, for example, an exploratory or confirmatory study. The appropriate methods for data collection and analysis that will best satisfy the needs of the investigation should then be employed. In other words, theoretical consistency is the principle that all the elements, from the research question through to the analysis procedures, are in harmony in terms of their approach.

In practice, according to the authors of six of the articles, theoretical consistency was attained by basing research questions on the literature, basing the coding scheme on theoretical constructs, and ensuring that the analysis is reliably related to the research question - a process which is also facilitated in one case by the use of CAQDAS. The author in this particular article argued that due to the fact that CAQDAS aids the management of the analysis process it can ensure, *"...that having applied the heuristic paradigm in approach and design, the analysis is logical, well constructed and reliably related to the research question"* (Case 76: 169).

4.5.2 **Searching**

'Searching' validation techniques are termed as such, due to the fact that they are mostly facilitated by the searching features of CAQDAS programmes. Of those forty instances in which such validation techniques were noted, the majority (thirty-one) reported the use of CAQDAS.

4.5.2.1 Consistent examination and accurate searching

Data can be consistently and thoroughly examined with the use of features such as Boolean, context, proximity and sequencing searches. Consistency in examination translates into the use of regular methods for inspection, which promotes the comparability of the findings. It also ensures that data are not overlooked due to a human error and, as one author stated, it can ensure that *"...all comments in the data set using specified words or phrases [are] examined"* (Case 39: 423).

Drisko (1998) and Welsh (2002) are both of the opinion that consistent examination and accurate searching by means of CAQDAS enhances the rigour or trustworthiness of analysis, since such searching is more comprehensive and accurate than manual searching. This validation technique was reported in three cases, and in each case it was performed with the use of CAQDAS.

4.5.2.2 Accurate recording and retrieval

These two features of CAQDAS can enhance the accuracy with which analytic actions are performed. In this context, accuracy may be understood as the overall extent to which the inferences made throughout the research process may be considered to be trustworthy or credible. In six cases, it was reported that the use of CAQDAS facilitated accurate recording and retrieval, thereby enhancing the overall validity of the analysis process. The recording of text, notations and analytic actions are saved and stored, without the likelihood of them being misplaced. Text retrieval by means of CAQDAS is more accurate than manual retrieval, since all instances of a desired text element can immediately be retrieved, *"...thus facilitating rigorous data examination"* (Case 32:11). The desired text and codes are then presented, even displaying the retrieved text in its immediate textual context.

4.5.2.3 Cross-case comparisons

Cross-case comparisons entail the contrasting of raw data and comparing the data with the output for each participant. This technique was reported in seven cases and was predominantly (in six cases) performed with the use of CAQDAS.

4.5.2.4 Review or revision coding

Reviewing and revising a coding structure involves the examination of any discrepancies in a categorisation system. As mentioned in some cases, it also entails discussing coding structures with others, in order to revise the coding accordingly, and thereby enhancing the internal validity of the research. Of the 18 cases that reported the application of this validation technique, just more than half (10) of the authors reported the use of CAQDAS. Although the search features of CAQDAS are not considered an absolute necessity in this regard, they do seem to aid the reviewing of codes, as illustrated in the following excerpts: *"...a series of text searches was run to cross-check several of the coding categories"* (Case 33: 104); and: *"...data were re-examined after coding in NVIVO (qualitative data analysis software) to verify and test out the categories"* (Case 108: 987).

The editing capabilities of CAQDAS also greatly facilitate the consistent revision of codes, by assisting the *"...application of the constant comparative method (Glaser & Strauss, 1967) by allowing the review, in an iterative way after each interview, of every portion of text coded under the same category to ensure consistency of coding and interpretations"* (Case 11: 44).

4.5.2.5 Systematic, standardised or automated coding

Systematic application of a coding scheme is aided by CAQDAS through the use of the 'auto code' feature. Although many authors of the articles studied state that systematic coding procedures were used - for example, *"...[a] rigorous, reproducible four-stage process was used"* (Case 27:155) - it is seldom specified what the steps in such coding procedures actually are, and what makes them "standardised". This validation technique is entirely dependant on CAQDAS, which was used in all six cases in which it was reported.

4.5.3 **Standard procedures**

Standard analysis procedures entail the act of analysing the text according to set methods, as well as outlining the systematic analysis process. This is done

to promote the transparency of the analytic process, in order to enhance the external validity (transferability) of the results. As previously discussed, there is a tendency among qualitative researchers to omit such detailed descriptions of the procedural steps taken during data analysis; but by employing these validation techniques, this problem can be overcome. The validation techniques grouped into this category were reported in eleven instances, of which approximately half (five cases) employed CAQDAS for this specific use.

Analysing the data according to standard procedures requires that the researcher should address researcher bias by not only explicitly referring to the procedures, but also explaining what they are and how they are executed. For example:

"Various features of the analysis software, including the so-called 'word cruncher' (which ranks the frequency of words in the text), 'search swarms' (to locate text patterns) and queries (to analyse code combinations in the data set) assisted our systematic analysis of the data" (Case 97: 263).

The systematic outlining of procedures differs from the above-mentioned procedure, in the sense that, in the former, the researcher merely provides a framework of what has been done, without explaining in detail how it was performed.

4.5.4 **Data display**

'Data display' validation techniques refer to techniques based on the ability of CAQDAS to aid analysis and enhance the validity of the research interpretations, by graphically displaying analysis elements on-screen. Consequently, these validation techniques are performed predominantly with CAQDAS (of the forty-three instances of such techniques noted in the sample, thirty-five were performed with CAQDAS).

4.5.4.1 Audit trail

The audit trail (noted in fifteen cases) records the intentions of decisions taken during the analysis, as reflected in raw data, analysis procedures, notes as well as memos. In one case the motivation for the use of an audit trail was

explained as that it *"...was maintained to capture any reflections, interpretations, and questions that arose during the research process"* (Case 54: 446). This is done to enhance the transparency of the entire research process, which can also assist external auditors in their investigative inquiries. Drisko (1998) states that this technique reconstructs the research decisions that were made, and that thereby the *"...trustworthiness of the data and analysis can be enhanced and made more accessible for outside review"* (10). The use of an audit trail to enhance the validity of inferences was performed with the use of CAQDAS in 8 of the 15 cases. The use of CAQDAS programmes for this purpose is explained in the following excerpt:

"One example of increasing rigor is the software's ability to track all aspects of data manipulation and coding, which increases transparency of the data for review by peer debriefers, auditors, and other researchers interested in the study" (Case 4: 27).

4.5.4.2 Frequency counts

Frequency counts, which are produced by many CAQDAS packages, represent qualitative findings numerically. Although the narrative interpretations of text may be questioned (at least by some readers), numbers usually do not lie. Quasi-statistics (the combining of narrative data with complimentary numerical data) can demonstrate the density of the inductive codes, in terms of their frequency of occurrence. The use of numbers can also portray information about dominant themes and interpretations, for comparative purposes, by comparing *"...frequency tables [...] in an exploratory way to explore the salience of different codes for different groups of participants"* (Case 33: 104). Frequency counts were performed in 10 cases, all of them with the use of CAQDAS.

4.5.4.3 Matrix displays

Matrix displays allow the validation of interpretations by facilitating the checking of patterns (Bazeley & Richards, 2000). Matrices in themselves have no power to enhance validity, but they can be employed for differing purposes to assess the soundness of interpretations, due to the fact that matrix formats can simplify visual identification and/or presentation of similarities. In

quantitative research, matrices can help make sense of relationships between concepts and indicate significant correlations, whereas in qualitative research, a matrix comprising of themes or quotations can help the reader assess its content for pattern identification. Furthermore, it can be employed to summarise data for cross-comparative purposes, to determine whether there are thematic relations in a data set that occur across data collection sessions and across cases.

Seven cases employed matrices for validation purposes, and 6 of these matrices were constructed with the use of CAQDAS. The authors of one article stated that a quotation matrix was even employed to examine the representativeness of the respondents:

"Matrices examining themes by respondents were developed to ensure that particular respondents were not over-represented in the quotations" (Case 10: 279).

This is done to ensure that the themes derived from examining the quotations originated from the perspectives of a variety of participants. Visually demonstrating that the themes are present across the sample ultimately enhances the external validity of the results and increases at least the perceived soundness of interpretations. In another case, it was stated that dissimilarities in interpretations could be readily identified by means of matrices:

"...we compared our matrices, resolving any discrepancies through discussion and returning to the data" (Case 22: 208).

4.5.4.4 Pattern detection or matching

The graphic display of data in the form of, for example, networks, relational links, and hierarchical code structures, has an explanatory function, in that it allows a researcher to examine the existence of structural relationships across data sets and thereby to enhance internal validity. Theory and network building software programmes (such as Atlas.ti and NVivo) facilitate this technique, *"...employed as an analytic tactic to enhance the explanatory capacity of the study"* (Case 29:953), through their capacity to build networks that demonstrate relational links.

In a programme such as NVivo, code profiles (a summary of the code positions in documents), can validate patterns and illustrate whether the application of the codes is consistent and associated with the research question (Bazeley & Richards, 2000). Just as similarities and relationships can be easily visualised with relationship building, dissimilarities in the data can also be detected:

"...to confirm emerging patterns, always alert to disconfirming evidence" (Case 69: 350).

"These categories were then scrutinized for relationships between them and further application and/or confirmation to the initial framework was made" (Case 63: 4).

Visually representing the disconfirming evidence alerts the researchers to the fact that the interpretations cannot be accepted uncritically. Pattern detection as a validation technique was discussed in 4 cases, all employing CAQDAS in this regard.

4.5.4.5 Visual relationship building

The capacity of some software programmes to produce visual models, networks or conceptual maps relates to the above-mentioned technique, in the sense that it aids theory development based on relationships between categories, by graphically representing links, commonalities and prominent themes. Seven cases validated research findings, all with the help of CAQDAS, by building relational structures.

This involves building a chain of evidence by displaying how different concepts are related to each other; in other words, visually illustrating theory in motion. This can be done by connecting them through the display of directional links in the form of lines, and specifying what the relation is. The objective is to enhance construct validity, by visually displaying that the relational concepts - as interpreted by the researcher - do have credible, linear linkages.

Making use of the ability of CAQDAS to create hyperlinks can enhance the complexity and soundness of research, by achieving an overview of linked elements that is not possible with manual methods. Hyperlinks can even be created between segments from the text of a transcript and segments in a

recorded audio excerpt, thereby promoting the repetitive checking of interpretations and helping "...to facilitate continual closeness to the context of the original data" (in this case the recorded interview) (Case 93: 381).

4.5.5 Checks

Validation techniques are grouped into this category, based on the fact that they all imply some form of closer inspection, so as to scrutinise research findings. Two-hundred and forty-seven instances of such validation techniques were reported in the articles sampled, but only approximately a quarter (sixty-five) was performed with the use of CAQDAS.

4.5.5.1 Audiotape data collection for clarification

According to Seale and Silverman (1997) the recording of data on audio or videotape may validate the interpretative process, by bestowing it with a sense of objectivity, as the following quotation illustrates:

"The interviews lasted 45 minutes on average and were taped to expand validity" (Case 103: 67).

The raw data are therefore easily accessible for evaluation of the inferences made, double-checking for any inconsistencies, and/or further inspection of issues that are unclear.

4.5.5.2 Transcription preparation

This technique was commonly used to validate raw data prior to analysis, as reported in 27 of the 108 cases, and it includes the preparation of transcripts by professional transcribers, who are less likely to capture the recordings inaccurately.

"Using a transcriber who was not a part of the interview process assisted the researchers in assessing what was actually said, not what they inferred from the conversation" (Case 49:14).

Due to the fact that the transcribers are not involved in data collection, they can perform the task at hand more 'objectively' than the fieldworkers and researchers, who are directly involved. Furthermore, transcripts may also be reviewed by interviewers, researchers and/or transcribers, in order to evaluate

their accuracy. In one case (97: 263), participants were requested to type their responses, which were double-checked for accuracy by the researcher, *"to correct possible errors and omissions"*.

Finally, in studies that involve translation of transcripts also includes checking, by bilingual researchers, the adequacy of the translation of responses.

4.5.5.3 Back-and-forth cross-examination

A back-and-forth interplay between data collection and analysis implies the constant review of raw data and other reflexive documentation, and comparing these to the inferences made. In practice, it involves the following:

"The contents of each coding category and query were printed out and reviewed in detail and in tandem between the first two authors to ensure agreement on the nature of participants' responses to the interview questions" (Case 10: 279).

The manual execution of this validation technique, as suggested in the abovementioned extract, is in the minority, as it was noted in only 4 of the 11 reported cases.

4.5.5.4 Illustrative quotations and in vivo coding

By including illustrative quotations in the final report, the readers are allowed to assess the researcher's interpretations for themselves, thereby passing *"...their own judgments about the accuracy and usefulness of the researcher's summaries and conclusions"* (Case 39: 423). Twenty cases discussed the use of this validation technique, of which 9 cases mentioned the use of CAQDAS for this purpose. Furthermore, the use of *in vivo* codes (the act of coding by using the exact wording of participants to conceptualise categories) is also believed, at least in 2 cases, to add to the validity of the findings. This is because the resulting low inference data, which implies that limited interpretation by the researcher is required, is strongly grounded in the accounts of the participants.

4.5.5.5 Triangulation

A relatively large number (44) of cases triangulated data by making use of varying data sources, as well as different methods, in the same study. This is done not only to validate self-reported data, but also to improve internal - particularly construct - validity. For example, as illustrated in the following quote, combining interview data with participant observation eliminates the need to rely solely on self-reported data, while also verifying the findings:

"...the interviews and focus groups were used to provide the study with a means of checking emerging themes and helping to test and improve the credibility of findings" (Case 72: 585).

Software programmes are able to store different types of data and, as such, may facilitate triangulation. For example, Atlas.ti can assign different Primary Docs in differing formats into one "hermeneutic unit" (Rambaree, 2007). However, the present study shows that CAQDAS was only employed for this particular purpose in 3 of the 44 cases or 2.7 percent of the total sample. In these cases, CADQAS aided the storage and analysis of textual documents from different sources (such as meeting notes, interview transcripts, annual reports, company and organisational documents).

In some other articles, triangulation took the form of the inclusion of demographic data (noted in 2 cases, once with the help of CAQDAS) to help the researcher assess trends and relationships, and thereby gain a more in-depth understanding of the phenomena under investigation. Qualitative reports are also triangulated with statistical reports (inclusion of numerical data) in 2 cases - a process assisted by the use of CAQDAS.

According to Kidd and Parshall (2000: 304), "Similar findings derived from multiple sources increase confidence in the validity of constructs and the theoretical generality of relations between them". Barbour (2001), however, considers triangulation difficult to perform, since findings produced by different research methods, with different approaches and aims, cannot be compared:

The production of similar findings from different methods merely provides corroboration or reassurance; the absence of similar findings does not, however, provide grounds for refutation. This is because

different methods used in qualitative research furnish parallel datasets, each affording only a partial view of the whole picture (1117).

Triangulation seems to imply that a single, underlying truth is sought, and as such, stands in opposition to the qualitative (interpretative/relativist) approach, which is based on the assumption that multiple viewpoints exist. Within this approach, then, contradictions in triangulated findings should not threaten interpretations, but rather broaden the interpretative dimension. Long and Johnson (2000) aptly state that inconsistencies among differing accounts do not invalidate findings, but rather illustrate the variety of context-bound data collected.

4.5.5.6 Impartial experienced coders

"...to eliminate bias, the course instructor did not code the data"
(Case 58: 49).

As illustrated in this quote, the use of independent coders (coders who are not part of the investigative team) is aimed at preventing researcher bias, and thereby producing dependable and credible interpretations. In another case, coding was performed by one of the authors and an independent confederate, who then discussed any uncertainties and revised the coding accordingly. It was mentioned in one of the three reported cases that the impartial coder coded the data with the help of CAQDAS. Underlying the use of experienced coders, there seems to be an association drawn between the skill of the coders with the credibility of the coding system: since the coders have the know-how, their interpretation must be credible.

4.5.5.7 Use of multiple coders and/or analysts

With 52 recorded instances, this strategy, which also includes team coding as well as the independent examination and reading of transcripts, is the most commonly used validation technique reported in the articles studied. It is also with regard to this validation technique that one finds a very high frequency in the use of CAQDAS, since it is employed in 33 cases (63%) of the 52 recorded instances.

Independent coding assesses content validity (Kidd & Parshall, 2000), whereas the use of multiple coders, or team coding, avoids analytical contamination, so as to "...*limit any personal biases, subjectivity, and preconceptions*" (Case 15: 480). This technique is usually followed by discussions aimed at reaching a consensus and a resultant revision of coding schemes. After the coding schemes have been revised, they are combined into one condensed coding system, in order to enhance coding consistency:

"The use of multiple analysts also led to an enrichment of the analysis by including multiple perspectives, with ensuing discussions about interpretations leading to a conceptual clarification and refinement of the issues in question" (Case 96: 356).

In the research articles studied, the use of multiple coders is either performed by coding all data in CAQDAS, or by first coding on paper and thereafter entering final codes into CAQDAS. When the latter strategy is employed, one may question the extent to which CAQDAS played a role in enhancing validity.

Team research with the use of CAQDAS does, however, promote systematic exploration by and discussion among team members, in order to reach an agreement, which in turn influences the trustworthiness and rigour of the research (Welsh, 2002). The following quotes illustrate this point:

"Each interview transcript was read and coded by more than one member of the research team, thereby ensuring rigorous comparison of coding of the same data by multiple researchers and allowing ambiguities in coding to be resolved by discussion amongst the researchers" (Case 1: 3).

"`test Coder Reliability': Compare primary coder's work with secondary coders; `Hit Ratio' agreement between two coders: The identity of each case was rigorously maintained throughout the research process, ensuring that each retained its contextual individuality" (Case 66: 116).

Programmes such as Atlas.ti allow the merging of codes, and a team can therefore import their code lists and merge them (Rambaree, 2007). Multiple coding can refine interpretations and enhance the thoroughness of analysis. Independent coders can operate as 'devil's advocates' by alerting other coders or analysts to possible alternative interpretations.

What is, however, important to remember is that concordance among researchers is not the alpha and omega of ensuring that valid interpretations are made. Rather, the content of the disagreements and the accompanying discussion on the refinement of codes is what ultimately improves the validity of inferences (Barbour, 2001).

4.5.5.8 Repeating analysis

This type of technique refers to conducting a data analysis or coding procedure for a second time, in order to test whether the findings apply to other groups as well, and thereby promoting external validity:

"We conducted a second round of data analysis and it yielded no new work system or human error categories" (Case 81: 147).

The procedure of double coding is illustrated in the following excerpt:

"All transcripts were coded twice to ensure that codes created during the analysis of later transcripts were applied equally throughout the coding process" (Case 102:646).

Variations on this technique include the execution of independent studies, through the analysis of data collected from altogether separate samples, or by using different research teams for the analysis of data from similar samples.

4.5.5.9 Member checks

Together with triangulation (also recorded in 44 cases), member checks is the second most commonly used validation technique among the articles studied (also known as participant feedback or respondent validation). It is performed by returning the transcripts to the interviewees so that they can modify, add and/or delete information, to ensure that the transcripts reflect their responses more accurately, thus increasing the internal validity of the data:

"These feedback sessions allowed participants to comment on the veracity of the findings as they emerged" (Case 64: 621).

By reviewing the transcripts, the participants may check not only the accuracy of the interview data that had been captured, but the interpretations of these data as well. This is done to control for researcher bias, in addition to increasing internal validity.

Mays and Pope (1995) warn that participants may differ from researchers in terms of their views on what is actually important, and that participants tend to focus on small, individual facts, thereby losing sight of the overview. Their sense of validity may also differ from that of the researcher, and they change data to protect their own interests. Morse *et al.*, (2002) are of the opinion that participant verification is not a verification strategy, and they go as far as to say that it can even pose a threat to validity. Defining verification in terms of asking the participants whether the researcher's interpretations are correct, places the researcher under pressure to make the necessary alterations, merely in order to please the participants (Morse *et al.*, 2002). Barbour (2001) concurs that this technique poses a danger when researchers start rejecting their own interpretations to please participants.

A related, but more extensive approach involves interviewing participants twice in order to establish the credibility of their responses. Cross-examining the research participants in this way ensures that the collected data are accurate.

4.5.5.10 External peer review

This term includes techniques such as peer debriefing, supervision, the Delphi technique, the use of independent reviewers and researcher triangulation, as well as performing inquiry audits. External peer review was reported in 39 cases, in which only 6 the use of CAQDAS was mentioned.

Peer debriefing (also referred to as peer review or supervision) lends an air of objectivity to qualitative research, through the external identification of possible biases within the research, in order to ensure that "*...the analysis [is] constantly verified and [has] rigour*" (Case 107: 49). Peer review also guarantees that analytic steps are "*...supervised throughout the coding process to ensure consistency in the application of the codes*" (Case 98: 270).

The Delphi technique involves a procedure whereby a panel of experts discuss the research, in order to arrive at a majority consensus about interpretations. The use of independent reviewers, or researcher triangulation, confers a sense of objectivity on the inferences drawn, since they have been inspected by external parties. Although CAQDAS is not necessary for the

execution of this technique, it was employed for this purpose in 4 of the 9 cases that report the use of independent reviewers. Two quotations that best describe the process are as follows:

"...independent 'checker' reviewed the coded text AND coded text can be extracted and then viewed in relation to similarly coded text from all other primary documents in the hermeneutic unit" (Case 17: 586).

"Two academics checked and judged the relevance of the codes generated against a percentage of transcripts using a third qualitative software package capable of such checks" (Case 93: 381).

Whereas the independent reviewer re-examines the analysis process in order to refine and improve the research, the external auditor acts as a scrutinising judge, who evaluates analysis in terms of the data coding and interpretations, with an eye to enhancing the dependability of the findings of the study (Koch, 1994).

4.5.6 **Reflection**

These validation techniques aim to limit the researcher's personal, potentially biasing influence on the research process, through the introspective process of reflection. Fifty-nine instances of such validation techniques were noted, of which only a quarter (fifteen) was assisted by CAQDAS.

4.5.6.1 Reflexivity

Reflexivity includes the reflective process of maintaining an introspective stance throughout the research process, and therefore depends on the ability of the researcher to be aware of how his/her personal influences may potentially bias the research findings. Morse *et al.*, (2002) relate it to investigator responsiveness in attaining openness that is associated with creativity and insight, and define it as a "...willingness to relinquish any ideas that are poorly supported, regardless of the excitement and the potential that they first appear to provide" (Morse *et al.*, 2002: 11).

On a more practical level, reflexivity mainly translates into keeping a reflexive journal, and making reflexive memos and notes. The role that reflexivity plays in validating findings was discussed in 35 cases; CAQDAS was

employed in 6 of these cases, specifically for the use of making memos and notes. However, reflexivity also entails the contemplative re-reading of notes and transcripts, and reflective listening to audio tapes of the data collection sessions, as well as discussing and reviewing the process with others, as illustrated in the following quote:

"Investigators and research assistants from both sites were in regular contact to ensure that the analysis was comprehensive and consistent" (Case 99: 111).

Three documentation methods connected with reflexivity will now be discussed in more detail. First, keeping a research journal can help researchers to maintain the self-awareness highlighted above, which will, in turn, enhance the credibility of the inferences generated (Koch, 1994). Such reflexive journals are utilized to record thoughts, questions, reflections and ideas, which would aid interpretation, creativity and reflection (Johnston, 2006).

Secondly, memos can be created to capture analytical concerns and queries, as well as record additional information about the behaviour of the participants and context. Rambaree (2007) refers to Johnson (1997), who stated that the memo feature of Atlas.ti facilitate the accurate account and recording of transcriptions, thereby improving validity. In the articles studied, memos were employed to document creative ideas, which may pave the way for analytic theory building. Memos were also utilised to keep referential records about the location of text segments in the individual transcripts.

The third documentation method connected with reflexivity entails making notes to substantiate data, to aid the researcher's memory during analysis, and to describe, for the purpose of transparency, the rationale behind the conceptualisation of categories. In one case, for example:

"Procedures and strategies used for collecting, analysing and reporting data were recorded as procedural field notes to facilitate independent audit" (Case 42: 817).

With regard to reflexivity in general, an awareness of personal biases was explicitly referred to in 5 cases. Rambaree (2007) states that for a researcher, neutrality is impossible to attain, but the ideal is that researchers should at least be mindful of how they influence the research process and findings. Being

aware of one's own theoretical perspectives, expectations and assumptions can help researchers avoid introducing contextual and personal biases to their inferences.

4.5.6.2 Writing field notes prior to coding

Related to the development of an awareness of potential personal bias is the process of writing field notes prior to coding. It is argued that, if the field notes are written after coding has commenced, they will be influenced by the research findings and inferences generated until then. This technique was reported in only 2 cases, as a means to ensuring that the researcher's *a priori* beliefs do not influence his/her interpretations, by documenting procedural field notes before they can be "contaminated" by the researcher's analytic mind.

4.5.6.3 Team-based review and/or discussion

Team-based review and/or discussion (noted in 8 cases) involves dialogue among parties involved in the research project, and it is believed that "*...continuous communication between researchers [helps] with validation*" (Case 76: 170). It differs from peer review and researcher triangulation, which may also be based on dialogue between parties, but not necessarily only those directly involved in the research project. Team-based discussion is based on the principle that, if more than one researcher draws similar conclusions, the rigour of the findings are enhanced (Mays & Pope, 1995), since the plausibility of interpretations is affirmed if accepted by more than one party:

"To affirm consistency and validity, all research team members reviewed and discussed the results of each phase of data analysis"
(Case 104: 590).

In addition, team-based review and/or discussion also ensure that differing interpretative angles are not overlooked.

4.5.6.4 Thick descriptions

Descriptions of data collection sites and procedures enhance external validity, or rather transferability (as termed in qualitative research), by providing sufficient contextual information. By providing detailed accounts of the researchers' experiences and describing the theoretical construct under investigation, reflexivity is maintained and construct validity is enhanced (Koch, 1994). Kidd and Parshall (2000) are of the opinion that, "...even the best recording and transcription will not reproduce a session completely" (298).

The impact that thick descriptions have on the external validity of research findings is discussed in 2 cases; in 1 of these cases, the researchers employed CAQDAS to aid the validation process. The reasoning behind the use of thick descriptions is that it provides rich contextual and additional information as to justify the inferences made from the data. It was suggested in 1 case, that more than one member of the research team should be present at, for example, focus groups, to make detailed notes of verbal and non-verbal behaviour. Should there be any discrepancies or uncertainties regarding the transcriptions of the data collection sessions, this documentation of the research context can also aid the checking of transcriptions against tapes.

4.5.6.5 Considering alternative explanations and negative cases

This validation technique is based on assessing the convergence, and particularly the divergence of responses, in order to identify rival explanations, outliers and disconfirming cases. It is aimed at enhancing internal validity, by having "... *returned to the coded interview transcripts and gathered evidence in support of, and in contradiction to, [the researchers'] arguments*" (Case 65: 250). Mays and Pope (1995) make a plea for researchers to not only state that cases differ, but also to explain why. This process may also be performed with the use of CAQDAS, as is the case in 7 out of the 10 recorded instances, and as illustrated in the following case:

"Negative coding - using the opposite of a code - was used to identify nuances and alternative explanations" (Case 56: 439).

4.5.6.6 Summary of interpretations/decisions

Providing concise summaries of interpretational decisions make it easier for readers and evaluators of the research to examine the overall credibility of the themes emerging from an analysis. This validation technique was mentioned in 2 instances, of which 1 reported performing the technique with the use of CAQDAS.

4.5.7 **Field procedures**

The validation techniques grouped under 'field procedures' are relevant specifically and exclusively to the process of collecting data in the field. They share a concern with the authenticity of collected data, by ensuring that the data are comparable in terms of the basic subject matter covered and not subject to bias from researcher effects, such as researcher characteristics (for example race, gender, status and dress style) and researcher orientations (expectations and beliefs of the researcher) (Mouton, 1996). Field procedures also control for bias that may originate from research participant effects, such as social desirability, which is the "...tendency to respond in what participants believe to be the most socially acceptable manner" (Graziano & Raulin, 2004: 84). Field procedure validation techniques were reported in twenty-two instances, all executed without the aid of CAQDAS.

4.5.7.1 Ensuring anonymity and confidentiality

In 2 cases, anonymity and confidentiality are referred to, but not discussed as validation techniques. *"Anonymity, and the fact that participants never physically came together, ensured that participants and their personality factors were equalised, thereby minimizing participant biasing effects"* (Case 107: 48). Ensuring research participants of the confidentiality of responses combats participant effects, thereby enhancing the validity of self-reported data.

4.5.7.2 Prolonged engagement in the field and persistent observation

These are well-established validation techniques that aim to enhance the researcher's familiarity with and understanding of the context in which the research participants operate. In the words of one author, it "*...allowed the researcher to be open to the multiple influences and contextual factors most relevant to the phenomenon under study*" (Case 4: 26). Either prolonged engagement in the field, or persistent observation, or both were employed in 12 cases, and in all of them without the use of CAQDAS.

4.5.7.3 No incentives

In 2 cases it was argued that, if the participants are not presented with any incentives to partake in the study, there exists no reason for them to express any answers but their own. This technique is therefore believed to promote the validity of self-reported data, and to thereby increase the credibility of the findings.

4.5.7.4 Interview protocol, script or discussion guide

By following standardised interview questions, or at least specific issues to be addressed during data collection, ensures that the data are comparable across cases and increases the internal consistency of the responses to be analysed. The use of an interview protocol, script or discussion guide as a method of validation was noted in 4 cases. However, qualitative research utilises relatively unstructured interviewing techniques and, as Babbie and Mouton (2001) point out, a qualitative interview is usually only guided into a general direction, and not by posing specific questions. This type of unstructured interviewing makes it difficult to apply an interview protocol, while at the same time being truthful to the qualitative paradigm.

Similarly, standardised probes, used in semi-structured interviews "*...only when the interviewee did not cover all of the elements in their responses*", were applied in 1 case to reduce possible sources of bias "*...from the interviewee and interviewer, when the focus on a specific element or type of error dominated the interview*" (Case 81: 146).

4.5.7.5 Open-ended or “neutral” questioning

This technique, reported in 2 cases only, is aimed at controlling for social desirability (defined in section 4.5.7) as well as researcher or investigator bias, which refers to the influence that the researcher may have on the data or behaviour of participants (Graziano & Raulin, 2004).

4.5.8 **Other techniques**

The final set of validation techniques are categorised as ‘other’, due to the fact that each was discussed in one case only, while they do not relate to any of the above-mentioned categories.

4.5.8.1 Interviewing research participants in familiar settings

It is argued that this technique will set research participants at ease and increase their confidence level, thereby promoting the validity of self-reported data.

4.5.8.2 The use of multiple interviewers

This technique is reported as a way to limit investigator bias. On the other hand, this raises the issue of producing reliable data with multiple interviewers, since the use of more than one interviewer threatens the consistency of the manner in which the interviews are executed.

4.5.8.3 Systematic data collection

In 1 case only, it was mentioned that systematic data collection attributed to the overall validity of the research. The data collection procedures comprised of interviews with follow-up sessions, as well as participant observation for collecting anecdotal data. In this case, ensuring that similar issues are covered and similar procedures are followed in each data collection session, data was produced that are comparable in as many aspects as possible.

4.5.8.4 Participatory Action Research

In 1 case, it was stated that conducting research within the Participatory Action paradigm validated the research process by “...*maximizing input and guidance*

from target population representatives to help ensure that research variables, instruments and analyses are valid and do in fact reflect real-life experiences" (Case 83: 105). External validity (transferability) is therefore enhanced.

4.5.9 **Synopsis**

The following section will outline what validation techniques were prevalent in the examined articles, by grouping them into the categorisation system established during analysis. The categories are: theory, searching, standard analytic procedures, data display, checks, reflection, field procedures and lastly, other.

Validation techniques that are aimed at enhancing the validity of the findings by improving theoretical underpinnings include purposive and quota sampling, the application of replication logic, ensuring referential adequacy, basing categorisation on previously identified constructs or a coding guide, and ensuring theoretical consistency.

The 'searching' validation techniques, which are facilitated by the searching features of CAQDAS programmes, consist of performing any of the following: consistent examination and accurate searching, accurate recording and retrieval, cross-case comparisons, review or revision of coding, as well as systematic, standardised or automated coding.

The employment of standardised analytic procedures is a validation technique that aims to enhance the transferability of the findings, while data display validation techniques aim to enhance the validity of the research, by facilitating any one or more of the following: graphical display of analysis elements on-screen, audit trails, frequency counts, matrix displays, pattern detection and relationship building.

Validation techniques that specifically involve the performing of checks, include: reexamining audio recordings of data collection for clarification purposes, transcription preparation in the form of accuracy checks or translations, back-and-forth cross-examination of raw data to inferences, the inclusion of illustrative quotations in findings, performing *in vivo* coding, applying triangulation, the use of impartial, experienced coders, the use of

multiple coders and/or analysts, repeating analysis, performing member checks and submitting research findings to external peer review.

Reflection-enhancing validation techniques are aimed at limiting a researcher's personal influence on the research process through the introspective process of reflectivity, writing field notes prior to coding, discussing and reviewing interpretations collectively as a research team, providing thick, contextual descriptions of the research setting, considering alternative explanations for research findings, and making summaries of research decisions and inferences.

Validation techniques that are specifically performed during data collection, i.e. in the field, include ensuring the anonymity of participants and/or keeping responses confidential, maintaining prolonged engagement in the field, persistent observation, refraining from providing any incentives to participants, adhering to an interview protocol and/or discussion guide, and asking open-ended and neutral questions. Other validation techniques, each reported in one case only, include the interviewing of participants in familiar settings, the use of multiple interviewers, systematic data collection and finally, conducting research within the Participatory Action Research paradigm.

Based on this analysis of the types of validation techniques employed in a sample of qualitative research articles, one may assume that CAQDAS has the potential to validate research, since it can be employed in many of the validation techniques identified as prominent in qualitative research. However, as the data on CAQDAS use illustrate, the potential advantages that the software could offer qualitative research in terms of validity are often under-utilised, or completely ignored. In reality, as reflected in Table 5, manual techniques still prevail, since 300 (66 percent) of the 452 instances of validation techniques recorded, were performed manually.

In the sample of articles analysed, it seems that CAQDAS is predominantly viewed by qualitative researchers as a management tool, in particular for sorting and storing of data, text retrieval, and coding.

4.6 **Validation techniques and the use of CAQDAS**

In this section, the role of CAQDAS programmes in the execution of the discussed validation techniques will be considered in more detail. Those validation techniques that are completely reliant on CAQDAS will be highlighted, followed by a discussion on the reasons why certain types of techniques, which could arguably (on the basis of CAQDAS capabilities discussed in chapter 2) have been more readily performed with the aid of CAQDAS, are performed manually.

Those validation techniques identified in this study that would not exist without, or prior to the existence of, CAQDAS, utilise two important capabilities of CAQDAS: first, to produce visual representations of the data, and secondly, to perform accurate and systematic procedures throughout the research process. The techniques that employ the visual representation capabilities of CAQDAS include the building of a chain of evidence, use of matrix displays, pattern detection, hyperlinks, and the building of models, networks, or conceptual maps. The techniques that mainly draw on the advantages of CAQDAS in terms of accuracy and systematisation include standardised and automated coding, accurate retrieval of text segments, use of codes and memos, consistent examination of, and accurate searching within, text and code lists, and reliable recording of all performed actions. In addition, the calculation of frequency counts and the processing of numerical and demographic data are also more readily performed with CAQDAS.

Nevertheless, it seems that the manual execution of many validation techniques is still preferred. This is due to the fact that, for many of the validation techniques dominant in recent qualitative research, applying CAQDAS tends to be impractical. These include gaining participant feedback, professionally preparing transcripts and reviewing them for accuracy, conducting peer debriefing, maintaining reflexivity, having team discussions, ensuring prolonged engagement in the field, conducting persistent observation, and employing triangulation.

It is, however, also observed that, even though the use of CAQDAS for certain validation techniques proves possible in some cases, it is simply not

employed. One author even went as far as printing English versions of the transcript text from the programme, in order to code them manually on the printouts. It was specifically with regard to the following validation techniques that one may argue that CAQDAS could potentially have been used in those instances where a manual approach was adopted: analysing according to standard procedures, maintaining audit trails, submitting to inquiry or external audits, producing reflexive documentation (notes and memos), as well as employing triangulation. In fact, the use of CAQDAS in assisting triangulation was mentioned in only 3 of the 44 cases that reported triangulation as a validation technique, despite the potential of CAQDAS (owing to technological advances) to store differing types of data of varying formats. There were even cases in which audit trails and coding by multiple coders were approached manually. In other cases, where multiple coders or analysts worked together, the data were coded manually, while the coded text was imported into CAQDAS for further management.

4.7 **Summary**

This chapter reported on the results on an analysis of data collected from 108 research articles, published from 1996 to 2009. The articles were published mainly in journals in the fields of medicine and social science, although the fields of business management and economics, education and development, leisure, sport and exercise as well as information science and library studies are also represented.

By far the most predominant types of software programme used, reported 64 instances in these articles, are QSR N programmes (including NUD.IST, NVivo, N4, N5 and N6), followed, with 34 instances, by Atlas.ti and MAXqda (including the earlier version winMAX) reported in 3 instances. HyperResearch was reported in only 2 instances, while CI-Said, Ethnograph, QDA Miner and TextStat were each reported only once. It is interesting to note that the three most commonly used programmes are predominantly code-based-theory builders. QSR N programmes and Atlas.ti include in their features the ability to make memos, edit or merge codes, perform Boolean, proximity, sequential

and semantic searches, and coding or indexing the text, while allowing multiple codes to one segment and auto coding. Earlier versions of MAXqda have limited search functions and do not include all of the above-mentioned capabilities. Features that all of the three commonly used programmes have in common is that they can not only perform frequency counts on words, text segments or codes, but also create hierarchical relationships, so as to aid theory building. Theory building is facilitated through the creation of networks and matrices, the identification of code patterns, or the creation of hypertext links.

With regards to trends in CAQDAS use over the period 1996 to 2009, it was found that there has been a general increase in the number of qualitative research articles reporting CAQDAS use over the past 13 years. The earliest instance of an article that describes qualitative research and makes reference to how validity was enhanced, at least in part, with the use of CAQDAS, was published in 1996, as opposed to the 18 articles published in 2006 and 2007. This trend seems to reflect an increased awareness of CAQDAS, which is most probably the result of marketing campaigns, which allow access to the programmes through free downloads and manuals. When examining the use of particular software programmes at certain points in time, it is concerning to note that in quite a number of cases, 'outdated' programmes were used, despite the availability of newer versions. This signifies the use of what may be considered obsolete analysis techniques that are incomparable to the multifaceted and intricate actions performed by modern software programmes, that make a more in-depth analysis possible.

The investigation into the specific types of validation techniques employed in qualitative research, as reported in scientific articles, demonstrated that the techniques are in most cases performed manually. Thus, although CAQDAS does offer a number of benefits, particularly in the light of recent technological advances, most techniques can, and are, still performed without CAQDAS. The only techniques that would have been impossible without CAQDAS are those that are based on the data display features of CAQDAS, as well as on the accuracy and consistency offered by CAQDAS in the execution of certain

actions. The findings generated by this study therefore seem to support the hypothesis that CAQDAS *per se* does not enhance validity, since it is predominantly utilised merely as a research tool. In most cases of qualitative research reporting that were analysed, CAQDAS is seen as a means to manage data, rather than to contribute to the validity of qualitative research. The significance of these results and conclusions drawn from these findings will be discussed in the following chapter.

CHAPTER 5

Conclusion

5.1 **Introduction**

This final, concluding chapter will summarise the main findings within the context of the reviewed literature. The chapter will bring the thesis to a close with a discussion of the limitations and significance of the study, as well as considerations for future research that flow from the study.

Mouton (1996), states that the overall aim of social research is to "...produce knowledge that is as close as possible to the truth" (28). Attaining such truthful knowledge in the qualitative research paradigm, which aims at producing an in-depth understanding of the idiosyncratic worlds of the participants under study, is challenging. Mouton (1996) explains the concept of truth further:

Truth is an absolute notion. A statement is either true or false. And although we need the notion of truth as a regulative ideal, a goal to aspire to, we also need other terms such as validity and plausibility to cover the range of possibilities that typically occur in concrete social research when we fall short of the ideal (31).

When dealing with research phenomena that are characterised by relatively abstract notions and incorporate multiple world views of individuals under study (such as is commonly the case in qualitative research), it is inappropriate to seek an ultimate truth. More suitable terms would include plausibility, credibility or believability of research findings.

Researchers, as producers of knowledge, have the responsibility to report credible findings to their audience, in particular their peers. This credibility is attained through verification methods, or as referred to throughout this thesis, validation techniques. Morse *et al.*, (2002) define verification as "...the process of checking, confirming, making sure and being certain" (9). They further

distinguish between procedures that determine validity during inquiry, as opposed to procedures that provide the completed analysis with credibility. The ideal is, of course, to combine validation techniques that can guide a research process from its theoretical underpinnings through to the implementation of the research design and the documentation, analysis and verification of the research process and findings. This is done to "...place responsibility with the investigator rather than external judges of the completed product" (Morse *et al.*, 2002: 15).

5.2 **Main findings and discussion**

The study was aimed at determining empirically whether CAQDAS could be considered necessary for the performance of validation techniques employed by qualitative researchers, in order to consider to what extent CAQDAS can make significant contributions to validating qualitative research. Parmeggiani (2008) refers to Singh (2003), who states that CAQDAS is a mind-tool that aids reflexive and rigorous analysis, thereby allowing the researcher to focus on the conceptual aspects of data analysis, while the computer takes care of the mechanics (Thompson, 2002).

The research questions that guided the study are as follows: which CAQDAS programmes have been used for qualitative analysis since 1996; what trends over the past 13 years with regards to CAQDAS use and preferences for specific programmes can be identified, and lastly, the primary concern: which validation techniques have been utilised in qualitative research, and were these applied with or without the use of CAQDAS?

The sample consists of 108 research articles published from 1996-2009. The types of software programmes used in these articles are QSR N programmes (including NUD.IST, NVivo, N4, N5 and N6), reported 64 instances, followed by Atlas.ti reported 34 instances and MAXqda (including the earlier version winMAX) reported 3 instances. HyperResearch was reported in 2 instances, while CI-Said, Ethnograph, QDA Miner and TextStat were reported only once. The three software programmes, which are most commonly used in the investigated studies, are predominantly code-based-theory builders. They are

QSR N (including NUD.IST, NVivo, N4, N5 and N6), Atlas.ti and MAXqda (including the earlier version winMAX).

With regards to the trends in CAQDAS use over time, a 13-year time span during which the articles were published, was considered. It was found that the earliest instance of an article that describes qualitative research and makes reference to how validity was enhanced, at least in part, with the use of CAQDAS, was published in 1996, as opposed to the 18 articles published in 2006 and 2007; which suggests that there has been a general increase in CAQDAS use over the past years. The investigation of the use of specific software programmes, as reported at particular points in time, alerts to the fact that, despite the availability of updated versions of at least some of the software programmes, a number of researchers employed what could be considered outdated programmes, and as such, are employing analysis techniques that are incomparable to those made possible by more modern software programmes.

Based on the reviewed literature, it seems as though CAQDAS is regarded by many researchers as the ultimate validation technique in itself, as they believe that it provides qualitative research (considered often as the “step-child” of scientific inquiry) with an air of credibility. Peter and Wester (2007) even offer the extreme viewpoint that “...it should be unthinkable that a researcher performs an intensive interpretive analysis that meets the standards for scientific work, without the support of an adequate computer program” (657).

More specifically, it is believed that CAQDAS enhances the validity of the interpretative analysis process by controlling for threats to validity (Siccama & Penna, 2008). Siccama and Penna (2008) explain how the use of NVivo, for example, can dispose of validity threats by warranting that interpretations are thoroughly interrogated. This is achieved through the use of case nodes (organising relevant data into case files), linking demographic attributes to cases for comparative inquiries, running the query tool for within-case and across-case analysis, as well as cross-examining the data with case-orientated coding (in-depth coding of each case) and variable-orientated coding (identifying themes across cases) techniques.

According to Gibbs *et al.*, (2002: n.a.), "The acid test for the acceptance of CAQDAS will be when researchers start using facilities in the software to carry out analysis that they couldn't possibly have considered, using traditional, manual techniques". This investigation demonstrated that, without the use of CAQDAS, most of the validation techniques employed could still have been performed, since they were, in most cases, performed manually. The procedures that were executed exclusively with CAQDAS rely on the visual display features of CAQDAS, as well as the possibility for accurate and consistent execution of certain actions that it offers.

Several promises regarding the way in which CAQDAS can enhance the validity of a qualitative inquiry, as reported in the literature, were reviewed in this thesis. The findings will now be discussed with reference to these promises, in order to determine to what extent they were fulfilled within qualitative research, as reported in the articles that were examined.

Visual data displays, which include matrices, networks, models or conceptual maps, are believed to strengthen the validity of interpretations, by demonstrating hypothetical relations between elements and by helping the researcher to draw conclusions more accurately (Huber & Garcia, 1991; Miles & Huberman, 1984). A second validity-related promise is that of analytic consistency, specifically in terms of the following: (1) coding, by ensuring that one stays within the limits of each code and that coding categories are mutually exclusive (Gibbs *et al.*, 2002); (2) systematic retrieval of data for comparative purposes (Wolfe *et al.*, 1993); (3) the consistent inspection of index systems, the content of categories and relationships between categories (Richards & Richards, 1994); and (4) consistent modification and editing (Bazeley, 2008).

Lonkila (1995) is of the opinion that the ability of software to retrieve and compare coding results and text systematically, can produce logical concept development and change "...a traditional monologue of the qualitative researcher to a dialogue both with colleagues and with the possible judges of the research" (47). The ability of software programmes, such as NVivo, to scope the data in the form of 'text search queries' and 'matrix coding queries',

allows the researcher to verify the completeness of the coding and determine how consistently codes were applied throughout texts (Siccama & Penna, 2008). This completeness of coding is believed to be an indicator of the overall rigour or trustworthiness of inferences (Johnston, 2006). In the articles investigated, consistency in analysis was achieved with the use of CAQDAS through its ability to perform systematic analytic procedures, including standardised and automated coding, accurate retrieval of text segments, codes or memos, consistent examination and accurate searching of the text as well as reliable recording of analytic actions.

Other promises regarding the way in which CAQDAS aids validity that are relevant to the research findings, include the double-checking of data by independent researchers (Dey, 1993) and the display of analytic procedures through audit trails, in order to enhance transparency of the research conducted (Wickham & Woods, 2005), to demonstrate explicit concrete steps (Dohan & Sanchez-Jankowski, 1998) and to make the research process open to independent inspection, public scrutiny and evaluation. The display of analytic procedures can enhance the validity of the research findings, by allowing external inspection to determine the consistency of analytic decisions and actions (Boulton & Fitzpatrick, 1997; Cousins & McIntosh, 2005; Smit, 2005; St John & Johnson, 2000; Wolfe *et al.*, 1993).

CAQDAS has the potential to assist in the application of many of the techniques that emerged in this study as those that play a predominant role in enhancing the validity of qualitative research. These techniques include the use of multiple coders or analysts, revising a coding scheme, establishing an audit trail, doing back-and-forth cross-examinations of data, considering alternative explanations and negative cases, as well as performing frequency counts. But the research also shows that CAQDAS is seldom used to facilitate or even support the execution these techniques, and even when it is used for validation purposes, the operational actions are not necessarily discussed. In the articles studied, CAQDAS is predominantly viewed by researchers as a management tool, which fits in with Drisko's (1998) statement that it "...is important to remember to bear in mind that QDA software is only a tool" (3). Although

CAQDAS undeniably has benefits, in many cases its use in applying validation techniques may be unnecessary.

It is not argued here that CAQDAS is completely redundant, or on the other hand, that it ensures the trustworthiness and credibility of research, but rather that its use in the execution of certain procedures may well improve the extent to which validity criteria are met. Ozkan (2004) affirms this view by stating that it is not CAQDAS that adds rigour, but rather the researcher's application thereof:

The things that ensured the believability of the conclusions in the research such as triangulation of data sources, extended experience in the environment, and research journaling had nothing to do with NVivo software, but the way this study was conducted by the researchers (594).

Barbour (2001) concurs by stating that these validation techniques or "...theoretical fixes (such as purposive sampling, grounded theory, multiple coding, triangulation, and respondent validation) do not, in themselves confer rigour" (1115), but it is rather ensured by the critical and systematic application of the techniques themselves within an in-depth understanding of qualitative research.

5.3 **Limitations of the study**

A major point of concern of this study relates to the selection of the data. There were factors beyond the control of the researcher that determined which articles could be selected for study. Practical issues, such as the availability of the literature, as well as the time available for data collection, played a defining role in this regard. As mentioned in the methodology section, the data were collected by making use of the databases provided by the Stellenbosch University Library service, as well as the search engines *Google Scholar* and *Scirus*, and that only those articles published in journals that are available in South Africa, were selected. Therefore, other articles that may meet the criteria for selection, but are not listed within these databases and search engines, and/or are not available in South Africa, are not included in the sample. However, it may be argued that those articles that were included are

all of a comparable academic standard, and allow the transferability of the research findings, due to the fact that they are representative of the scientific articles that describe qualitative research and make reference to how validity was enhanced, at least in part, with the use of CAQDAS. Another sampling limitation is the limited number of keywords searched, since keywords such as "open source" or "qualitative research tool" may have provided the sample with less commercially used software programmes. The inclusion of keywords relating to validity (e.g. "rigour", "trustworthiness", "control bias", "checks" etc.) could have expanded the sample. In the qualitative paradigm, a term such as trustworthiness is more commonly used than "validity", due to the fact that "validity" holds associations with accuracy in measurement, which is more fitting within the quantitative paradigm.

With regard to the internal validity of the study, the fact that scientific articles function as rhetorical tools, in particular when reporting on issues about validity, should be taken into consideration. Authors who report on their empirical studies aim to assure or even persuade the readers of the 'truthfulness' of the findings, by making use of convincing rhetorical tools. Therefore, doubt may be cast upon whether it was the validation techniques, or the "talk" about them, that was actually being examined

A related point is that the interpretations are only based upon what is reported in the articles, which are not necessarily a direct, accurate and even valid representation of the research process. As discussed in chapter 1, Welsh (2002) and Thompson (2002) are of the opinion that published qualitative research in general lacks clear and transparent reporting of the research procedures involved. For example, if an author used CAQDAS, but decided not to mention the fact, it was interpreted as the non-use of CAQDAS. An interesting angle, but unfortunately one yet untapped, is the question of how frequently CAQDAS use is reported among qualitative researchers in general, by sampling both CAQDAS-reporting and non-CAQDAS-reporting articles.

5.4 **Significance of the study**

One of the products of this study is a classification system of the validation techniques that emerged from the analysis of the research articles. Mouton (1996) refers to a conceptual framework with a categorising function as a typology, which aims to make an estimated grouping of the study phenomena in terms of their most obvious commonalities. It is hoped that the creation of the typologies of validation techniques would contribute in future to more clarity and transparency with regard to the reporting of the validation techniques in published qualitative research.

Methodological literature describing possible methods and standards for promoting the validity of qualitative research – mainly used in teaching - is plentiful, but the same cannot be said for empirical qualitative studies, since researchers describing their own research generally do not explain how these techniques were employed in practice. Researchers mainly refer to the existence of CAQDAS programmes, and describe the necessity for using them (Peters & Wester, 2007). A similar point is made by Anfara, Brown and Mangione (2002):

Although researchers claim to utilize triangulation and member checks and discuss the development of the themes presented, what is actually done is often anyone's guess. Most studies do not reveal these workings, and good writing can cover up awkwardly collected and poorly documented fieldwork (30).

By providing a meta-analytic critique of the use and relevance of CAQDAS for verification of qualitative research, it may also enrich future qualitative research, by improving the practical implementation of the software and the writing about its use in general. Barbour (2001) notes that in order to publish in certain journals, researchers have to report their studies according to specified requirements, which ultimately also influences the manner in which the entire analytic process will be conducted. For example, in medical research, researchers have to adhere to specific validation procedures, in order for their papers to be considered for publication in certain research journals. Thus, guidelines are needed to help such researchers comply with the

necessary publishing criteria, and this study could go a long way in providing them with a practical, step-by step understanding of how they could validate their data.

If literature on CAQDAS use is to have any real value, it should include critical, reflexive writing about how software was employed to validate the research process, so as to guide researchers in their research endeavours. Currently, published qualitative studies seldom include detailed descriptions of analysis procedures employed, but the use of CAQDAS can address this problem by allowing the analytic steps to become more visible to external judges (Welsh, 2002). Johnston (2006) expands on this, by stating that literature addressing research methodology in practice and the functionality of CAQDAS is now more in demand than ever before. This need stems from a vacuum that exists in research training at higher education institutions, which also fails to integrate components of research methodology in CAQDAS training (Johnston, 2006). Peters and Wester (2007) make the suggestion that future studies should therefore consider in more detail how authors and methodologists describe the way in which CAQDAS supports efforts to enhance the methodological quality of qualitative analyses procedures, in a way that can help researchers to understand what the benefits are of using this support.

References

- Anfara, V. A., Brown, K. M. & Mangione, T. L. 2002. Qualitative analysis on stage: Making the research process more public. *Educational Researcher*, 31(7): 28-38.
- Atherton, A. & Elsmore, P. 2007. Structuring qualitative enquiry in management and organization research. A dialogue on the merits of using software for qualitative data analysis. *Qualitative research in organizations and management: An International Journal*, 2(1): 62-77.
- Atkinson, P. & Delamont, S. 2006. In the roiling smoke: Qualitative inquiry and contested field. *International journal of qualitative studies in education*, 19(6): 747-755.
- Babbie, E. & Mouton, J. 2001. *The practice of social research*. Cape Town: Oxford University Press Southern Africa (Pty) Ltd.
- Barbour, R. S. 2001. Checklists for improving rigour in qualitative research: A case of the tail wagging the dog? *BMJ*, 322: 1115-1117.
- Barry, C. A. 1998. Choosing qualitative data analysis software: Atlas/ti and NUDIST compared. *Sociological Research Online*, 3(3): Page numbers not for reference purposes. Available: <http://www.socresonline.org.uk/socresonline/3/3/4.html>. [2009, May 5]
- Bazeley, P. 2008. Software tools and the development of multiple and mixed methods research. *International Journal of multiple research approaches*, 2: 127-131.
- Bazeley, P. & Richards, L. 2000. *The NVivo qualitative project book*. London: Sage Publications.
- Beeson, D. 1997. Nuance, complexity and context: qualitative methods in genetic counselling research. *Journal of genetic counselling*, 6(1): 21-43.

- Borreani, C., Miccinesi, G., Brulenni, C. & Lina, M. 2004. An increasing number of qualitative research papers in oncology and palliative care: does it mean a thorough development of the methodology of research? *Health and quality of life outcomes*, 2(7): Page numbers not for reference purposes.
- Boulton, M. & Fitzpatrick, R. 1997. Evaluating qualitative research. *Evidence-based health policy and management*, Dec: 83-85. (Volume number not available)
- Bourdon, S. 2002. The integration of qualitative data analysis software in research strategies: Resistance and possibilities. *Forum: Qualitative Social Research*, 3(2), Art 11: Page numbers not for reference purposes.
- Brown, C. & Lloyd, K. 2001. Qualitative methods in psychiatric research. *Advances in psychiatric treatment*, 7: 350-356.
- Brown, S. C., Stevens, R. A., Troiano, P. F. & Schneider, M. K. 2002. Exploring complex phenomena: Grounded theory in student affairs research. *Journal of college student development*, 43 (2): 1-11.
- Bryman, A. & Burgess, R. G. 1994. Refelctions on qualitative data analysis, in A. Bryman & R. G. Burgess (eds.). *Analysing qualitative data*. London: Routledge: 216-226.
- Burnard, P., Gill, P., Stewart, K., Treasure, E. & Chadwick, B. 2008. Analysing and representing qualitative data. *British dental journal*, 204: 429-432.
- Carvajal, D. 2002. The artisan's tools. Critical issues when teaching and learning CAQDAS. *Forum: Qualitative Social Research*, 3(2), May 2002: Page numbers not for reference purposes.
- Carverhill, P. A. 2002. Qualitative research in thanatology. *Death Studies*, 26: 195-207.
- Chapple, A. & Rogers, A. 1998. Explicit guidelines for qualitative research: a step in the right direction, a defence of the 'soft' option, or a form of sociological imperialism? *Family practice*, 15 (6): 556-561.

- Conrad, P. & Reinharz, S. 1984. Computers and qualitative data: Editor's introductory essay. *Qualitative Sociology*, 711 (21): 3-15.
- Cousins, K. & McIntosh, W. 2005. More than typewriters, more than adding machines: Integrating information technology into political research. *Quality & Quantity*, 39: 581-614.
- Dembkowski, S. & Hanmer-Lloyed, S. 1995. Computer applications – a new road to qualitative data analysis? *European journal of marketing*, 29 (11): 50-62.
- Dey, I. 1993. *Qualitative data analysis. A user-friendly guide for social scientists*. London, New York: Routledge.
- Dey, I. 1995. Reducing fragmentation in qualitative research, in U. Kelle (ed.). *Computer-aided qualitative data analysis. Theory, methods and practice*. London: Sage Publications: 69-79.
- Dohan, D. & Sánchez-Jankowski, M. 1998. Using computers to analyze ethnographic field data: Theoretical and practical considerations. *Annual review of Sociology*, 24: 477-498.
- Dolan, A. & Ayland, C. 2001. Analysis on trial. *International Journal of Market Research*, 43(4), 377-389.
- Drisko, J. W. 1997. Strengthening qualitative studies and reports: Standards to promote academic integrity. *Journal of Social Work Education*, 33 (1): 185-197.
- Drisko, J. W. 1998. Using qualitative data analysis software. *Computers in Human Services*, 15(1): 1-19.
- Drisko, J.W. 2004. Qualitative data analysis software. A user's appraisal, in D.K. Padgett (ed.). *The qualitative research experience*. Belmont: Wadsworth/ Thomson Brooks/ Cole: 193-214.
- Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. *Journal of advanced nursing*, 62(1): 107-115.

- Endacott, R. 2008. Clinical research 4: Qualitative data collection and analysis. *International emerging nursing*, 16: 48-52.
- Fielding, N. 2000. The shared fate of two innovations in qualitative methodology: The relationship of qualitative software and secondary analysis of archived qualitative data. *Forum: Qualitative Social Research*, 1(3), Art 22: Page numbers not for reference purposes.
- Fielding, N. G. 2002. Automating the ineffable: Qualitative software and the meaning of qualitative research, in T. May (ed.). *Qualitative research in Action*. London: Sage Publications: 161-178.
- Fitzpatrick, R. & Boulton, M. 1996. Qualitative research in healthcare: 1. The scope and validity of methods. *Journal of evaluation in clinical practice*, 2(2): 123-130.
- Force, D. P. & Richer, S. 1973. *Social research methods*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Fossey, E., Harvey, C., McDermott, F. & Davidson, L. 2002. Understanding and evaluating qualitative research. *Australian and New Zealand journal of psychiatry*, 36: 717-732.
- Gelo, O., Braakmann, D. & Benetka, G. 2008. Quantitative and qualitative research: Beyond the debate. *Integrative psychological & behavioural sciences*, 42: 266-290.
- Gibbs, G. R., Friese, S. & Mangabeira, 2002. The use of new technology in qualitative research. Introduction to issue 3 (2) of FQS. *Forum: Qualitative Social Research*, 3 (2), May 2002: Page numbers not for reference purposes.
- Gilbert, L. S. 2002. Going the distance: 'Closeness' in qualitative data analysis software. *International journal of social research methodology*, 5(3): 215-228.
- Golafshani, N. 2003. Understanding reliability and validity in qualitative research. *The qualitative report*, 8 (4): 597-607.

- Goodwin, C. & Heritage, J. 1990. Conversation analysis. *Annual review of Anthropology*, 19: 283-307.
- Graziano, A. M. & Raulin, M. L. 2004. *Research Methods. A process of inquiry* (5th Ed). Boston: Pearson Education Group, Inc.
- Harris, J. E., Gleason, P. M., Sheean, P. M., Boushey, C., Beto, J. A. & Bruemmer, B. 2009. An introduction to qualitative research for food and nutrition professionals. *Journal of the American dietetic associations*, 109: 80-90.
- Hesse-Biber, S. & Dupuis, P. 1995. Hypothesis testing in computer-aided qualitative data analysis, in U. Kelle (ed.). *Computer-aided qualitative data analysis. Theory, methods and practice*. London: Sage Publications: 129-135.
- Holsti, O. R. 1969. *Content Analysis for the social sciences and humanities*. Reading, Massachusetts. Menlo Park, CA: Addison-Wesley Publishing Company.
- Huber, G. L. & Garcia, C. M. 1991. Computer assistance for testing hypotheses about qualitative data: The software package AQUAD 3.0. *Qualitative Sociology*, 14 (4): 325-347.
- Johnston, L. 2006. Software and method: Reflections on teaching and using QSR NVivo in Doctoral research. *International Journal of social science research methodology*, 9(5): 379-391.
- Kelle, U. 1995. Introduction: An overview of Computer aided-methods in qualitative research, in U. Kelle (ed.). *Computer-Aided Qualitative Data Analysis: Theory, methods and practice*. London: Sage Publications: 1-17.
- Kelle, U. 2004. Computer-assisted qualitative data analysis, in C. Seale, G. Gobo, J. F. Gubrium & D. Silverman (eds.). *Qualitative research practice*. London: Sage Publications: 443-459.

- Kelle, U. & Laurie, H. 1995. Computer use in qualitative research and issues of validity, in U. Kelle (ed.). *Computer-Aided Qualitative Data Analysis: Theory, Methods and Practice*. London: Sage Publications: 19-28.
- Kidd, P. S. & Parshall, M. B. 2000. Getting the focus and the group: Enhancing analytical rigour in focus group research. *Qualitative health research*, 10(3): 293-308.
- Koch, T. 1994. Establishing rigour in qualitative research: The decision trail. *Journal of advanced nursing*, 19: 976-986.
- Kondracki, N. L., Wellman, N. S., Fada, R. D. & Amundson, D. R. 2002. Content Analysis: Review of methods and their application in nutrition education. *Journal of nutrition education and behaviour*, 34 (4): 224-230.
- König, T. No date. *CAQDAS –A primer*. Loughborough University, Dept of Social sciences. New methods for the analysis of media content. Available:
http://www.lboro.ac.uk/research/mmmethods/research/software/caqdas_primer.html. [2009, May 16].
- Krippendorff, K. 2004. *Content Analysis: An introduction to its methodology* (2nd Ed). Thousand Oaks, CA: Sage Publications.
- LeCompte, M. D. & Preissle, J. 1993. *Ethnography and qualitative design in education research* (2nd Ed). New York: Academic Press, Inc.
- Lee, R. M. & Esterhuizen, L. 2000. Computer software and qualitative analysis: Trends, issues and resources. *International Journal of Social Research Methodology*, 3 (3): 231-243.
- Lee, R. M. & Fielding, N. G. 1991. Computing for qualitative research: Options, problems and potential, in N.G. Fielding & R. M. Lee (eds.). *Using computers in qualitative research*. London: Sage Publications: 1-13.
- Lee, R. M. & Fielding, N. G. 1995. User's Experiences of Qualitative data analysis software, in U. Kelle (ed.). *Computer-aided qualitative data*

analysis. Theory, methods and practice. London: Sage Publications: 29-40.

Lee, R. & Fielding, N. 1996. Qualitative data analysis: Representations of a technology. A comment on Coffey, Holbrook and Atkinson. *Sociological Review Online*, 1(4): Page numbers not for reference purposes. Available: <http://socresonline.org.uk/socresonline/1/4/lf/html>. [2009, May 6].

Lonkila, M. 1995. Grounded theory as an emerging paradigm for computer-assisted qualitative data analysis, in U. Kelle (ed.). *Computer-aided qualitative data analysis. Theory, methods and practice*. London: Sage Publications: 41-51.

Long, T. & Johnson, M. 2000. Rigour, reliability and validity in qualitative research. *Clinical effectiveness in nursing*, 4: 30-37.

Lu, C. & Shulman, S. W. 2008. Rigor and flexibility in computer-based qualitative research: Introducing the Coding Analysis Toolkit. *International Journal of Multiple Research Approaches*, 2: 105-117.

Maclaran, P. & Catterall, M. 2002. Analysing qualitative data: Computer software and the market research practitioner. *Qualitative market research: An international Journal*, 5(1): 28-39.

Mangabeira, W. C., Lee, R. M. & Fielding, N. G. 2004. Computers and qualitative research. Adoption, use and representation. *Social science computer review*, 22(2): 167-178.

Manheim, H. L. & Simon, B. A. 1977. *Sociological research. Philosophy and methods*. Homewood, Illinois: The Dorsey Press.

Marshall, C. & Rossman, G. B. 2006. *Designing qualitative research* (4th Ed). Thousand Oaks, London: Sage Publications.

Mays, N. & Pope, C. 1995. Qualitative research: Rigour and qualitative research. *BMJ*, 311: 109-112.

- Mellion, L. R. & Tovin, M. M. 2002. Grounded theory: A qualitative research methodology for physical therapy. *Physiotherapy theory and practice*, 18: 109-120.
- Miles, M. B. & Huberman, A. M. 1984. *Qualitative Data Analysis. A sourcebook of new methods*. London: Sage Publications.
- Morrison, M. & Moir, J. 1998. The role of computer software in the analysis of qualitative data: Efficient clerk, research assistant or Trojan horse? *Journal of advanced nursing*, 28 (1): 106-116.
- Morse, J. M., Barrett, M., Mayan, M., Olsen, K. & Spiers, J. 2002. Verification strategies for establishing reliability and validity in qualitative research. *International Journal of qualitative methods*, 1(2): 1-19.
- Mouton, J. 1996. *Understanding social research*. Pretoria: J.L. Van Schaik Academic.
- Mouton, J. 2001. *How to succeed in your Master's & Doctoral studies. A South African guide and resource book*. Pretoria: Van Schaik Publishers.
- Muhr, T. 1991. ATLAS/ti – A prototype for the support of text interpretation. *Qualitative Sociology*, 14(4): 349-371.
- Neuendorf, K. A. 2002. *The content analysis guidebook*. Thousand Oaks, CA: Sage Publications.
- O'Day, B. & Killeen, M. 2002. Research on the lives of persons with disabilities: The emerging importance of qualitative research methodologies. *Journal of Disability Policy Studies*, 13 (1): 9-15.
- Ozkan, B. C. 2004. Using NVivo to analyze qualitative classroom data on constructivist learning environments. *The qualitative report*, 9(4): 589-603.
- Padgett, D. K., Mathew, R. & Conte, S. 2004. Peer debriefing and support groups. Formation, care and maintenance, in D.K. Padgett (ed.). *The qualitative research experience*. Belmont: Wadsworth/ Thomson Brooks/ Cole: 193-214.

- Parmeggiani, P. 2008. Teaching different research methods through the use of video analysis software for media students: A case study. *International journal of multiple research approaches*, 2: 94-104.
- Peters, V. & Wester, F. 2007. How qualitative data analysis software may support the qualitative analysis process. *Quality & quantity*, 41: 635-659.
- Platt, J. 1985. Weber's *verstehen* and the history of qualitative research: The missing link. *British journal of sociology*, 36(3): 448-466.
- Prein, G., Kelle, U. & Bird, K. 1995. An overview of software, in U. Kelle (ed.). *Computer-aided qualitative data analysis. Theory, methods and practice*. London: Sage Publications: 190-210.
- Rambaree, K. 2007. Bringing rigour in qualitative social research: The use of CAQDAS. *University Mauritius Research Journal*, 13A: 1-16, Special Issue.
- Rettie, R., Robinson, H., Radke, A. & Ye, X. 2008. CAQDAS: A supplementary tool for qualitative market research. *Qualitative market research: An international journal*, 11(1): 76-88.
- Richards, L. & Richards, T. 1991a. The NUDIST qualitative data analysis system. *Qualitative Sociology*, 14 (4): 307-324.
- Richards, L. & Richards, T. 1991b. The transformation of qualitative method: Computational paradigms and research processes, in N.G. Fielding & R. M. Lee (eds.). *Using computers in qualitative research*. London: Sage Publications: 38-53.
- Richards, L. & Richards, T. 1994. From filing cabinet to computer, in A. Bryman & R. G. Burgess (eds.). *Analysing qualitative data*. London: Routledge: 146-172.
- Roberts, A. & Wilson, K. W. 2002. ICT and the research process: Issues around the compatibility of technology with qualitative data analysis. *Forum: Qualitative Social Research*, 3(2), Art 23: Page numbers not for reference purposes.

- Robson, C. 1993. *Real world research. A reference for social scientists and practitioner researchers*. Oxford: Blackwell Publishers.
- Rolfe, G. 2006. Validity trustworthiness and rigour: Qualitative and the idea of qualitative research. *Journal of advanced nursing*, 53(3): 304-310.
- Ryan-Nicholls, K. D. & Will, C. I. 2009. Rigour in qualitative research: mechanism for control. *Nurse Researcher*, 16(3): 70-84.
- Sandelowski, M. 1995. On the aesthetics of qualitative research. *IMAGE: Journal of nursing scholarship*, 27(3): 205-209.
- Seale, C. 1999. *The quality of qualitative research*. London: Sage Publications.
- Seale, C. F. 2002. Computer-assisted analysis of qualitative interview data, in J. F. Gubrium & J. A. Holstein (eds.). *Handbook of interview research. Context & Method*. Thousand Oaks: Sage Publications: 651-670.
- Seale, C. & Silverman, D. 1997. Ensuring rigour in qualitative research. *European journal of public health*, 7(4): 379-384.
- Seidel, J. 1991. Method and madness in the application of computer technology to qualitative data analysis, in N.G. Fielding & R. M. Lee (eds.). *Using computers in qualitative research*. London: Sage Publications: 107-116.
- Siccama, C. J. & Penna, S. 2008. Enhancing validity of a qualitative dissertations research study by using NVivo. *Qualitative research journal*, 8(2): 91-103.
- Sinkovics, R. R., Penz, E. & Ghauri, P. N. 2005. Analysing textual data in international marketing research. *Qualitative Market Research: An international journal*, 8(1): 9-38.
- Sinkovics, R. R., Penz, E. & Ghauri, P. N. 2008. Enhancing the trustworthiness of qualitative research in international business. *Management International Review: MIR*, 48(6): 689-714.
- Sismondo, S. 2004. *An introduction to science and technology studies*. Malden/Oxford/Victoria: Blackwell Publishing.

- Smit, B. 2005. Computer assisted qualitative data software: Friend or foe. *SACJ*, 35: 107-111.
- Smith, C. & Short, P. M. 2001. Integrating technology to improve the efficiency of qualitative data analysis – A note on methods. *Qualitative Sociology*, 24(3): 401-407.
- St John, W. & Johnson, P. 2000. The pros and cons of data analysis software for qualitative research. *Journal of Nursing Scholarship*, 32 (4): 393-397.
- Tallerico, M. 1991. Applications of qualitative analysis software. A view from the field. *Qualitative Sociology*, 14 (3): 275-285.
- Tesch, R. 1990. *Qualitative research: Analysis types and software tools*. New York: The Falmer Press.
- Tesch, R. 1991. Software for qualitative researchers: Analysis needs and program capabilities, in N.G. Fielding & R. M. Lee (eds.). *Using computers in qualitative research*. London: Sage Publications: 16-37.
- Thompson, R. 2002. Reporting the results of computer-assisted analysis of qualitative research data. *Forum: Qualitative Social Research*, 3(2), Art 25: Page numbers not for reference purposes.
- Von Seggern, M. & Young, N. J. 2003. The focus group method in libraries: Issues relating to process and data analysis. *Reference service review*. 31 (3): 272-284.
- Webb, C. 1999. Analysing qualitative data: computerized and other approaches. *Journal of advanced nursing*, 29 (2): 323-330.
- Weitzman, E. A. 1999. Analysing qualitative data with computer software. *HSR: Health Service Research*, 35:5, Part II: 1241-1263.
- Weitzman, E. A. & Miles, M. B. 1995. *Computer programs for qualitative data analysis: A software sourcebook*. Thousand Oaks: Sage Publications.
- Welsh, E. 2002. Dealing with data: Using NVivo in the qualitative data analysis process. *Forum: Qualitative social research*, 3(2), Art 26: Page numbers not for reference purposes.

- Whitley, R. & Crawford, M. 2005. Qualitative research in psychiatry. *Canadian journal of psychiatry*, 50(2): 108-114.
- Wickham, M. & Woods, M. 2005. Reflecting on the strategic use of CAQDAS to manage and report on the qualitative research process. *The qualitative report*, 10 (4): 687-702.
- Williamson, J. B., Karp, D. A. & Daplin, J. R. 1977. *The research craft. An introduction to social science methods*. Boston: Little, Brown and Company, Inc.
- Wolf, Z. R. 2003. Exploring the audit trail for qualitative investigations. *Nurse educator*, 28(4): 75-178.
- Wolfaardt, J. B. & Roodt, G. 2005. Basic concepts, in C. Foxcroft & G. Roodt (eds.). *An introduction to psychological assessment in the South African context* (2nd Ed). Cape Town: Oxford University Press Southern Africa (Pty) Ltd.: 24-45.
- Wolfe, R. A., Gephart, R. P. & Johnson, T. E. 1993. Computer-Facilitated Qualitative Data Analysis: Potential contributions to management research. *Journal of Management*, 19 (3): 637-660.

Websites:

- CAQDAS networking project. Computer Assisted Qualitative Data Analysis. [Available: <http://www.soc.surrey.ac.uk/caqdas>].
- CAQDAS New Media Methods. [Available: <http://lboro.ac.uk/research/mmmethods/research/software/caqdas.html>].
- <http://www.code-a-text-.co.uk/cisaid.htm>
- <http://www.kovcomp.co.uk/QDAMiner/index.html>
- <http://www.maxqda.com>
- <http://www.niederlandistik.fu-berlin.de/textstat/software-en.html>
- <http://www.qsr.international.com>
- <http://www.researchware.com>

Appendix A

- Agosto, D. E. 2002. A model of young people's decision-making in using the web. *Library & Information science research*, 24: 311-341.
- Arditti, J. A. 1999. Rethinking relationships between divorced mothers and their children: Capitalizing on family strengths. *Family relations*, 48(2): 109-119.
- Ash, J.S., Gorman, P.N., Lavelle, M., Payne, T.H. *et al.* 2003. A cross-site qualitative study of physician order entry. *Journal of the American Medical Informatics Association*, 10 (2): 188-200.
- Babiak, K. M. 2009. Criteria of effectiveness in multiple cross-sectoral inter-organizational relationships. *Evaluation and Program Planning*, 32: 1-12.
- Barnard, A., Schurink, W. & De Beer, M. A. 2008. Conceptual framework of integrity. *SA Journal of Industrial Psychology*, 34(2): 40-49.
- Barrett, T. G. & Smith, T. 2008. Southern Coup: Recruiting African American Faculty Members at an Elite Private Southern research university. *American Educational Research Journal*, 45 (4): 946-973.
- Behnke, A. O., Taylor, B. A. & Parra-Cardona, J. R. 2008. "I hardly understand English, but..." Mexican origin fathers describe their commitment as fathers despite the challenges of immigration. *Journal of comparative family studies*, 39(2): 187-205.
- Beringer, A. J., Eaton, N. M. & Jones, G. L. 2007. Providing a children's palliative care service in the community through

fixed-term grants: the staff perspective. *Child: care, health and development*, 33 (5): 619–624.

Birkeland, S., Murphy-Graham, E. & Weiss, C. 2005. Good reasons for ignoring good evaluation: The case of the drug abuse resistance education (D.A.R.E.) program. *Evaluation and Program Planning*, 28: 247–256.

Blismas, N. G., Sher, W. D., Thorpe, A. & Baldwin, A. N. 2004. Factors influencing project delivery within construction clients' multi-project environments. *Engineering, Construction and Architectural Management*, 11 (2): 113-125.

Brazil, K., McAiney, C., Caron-O'Brien, M., Kelley, M. L. *et al.* 2004. Quality End-of-Life Care in Long-Term Care Facilities: Service Providers' Perspective. *Journal of Palliative Care*, 20 (2): 85-92.

Brookes, S. J., Summers, J. A., Thornburg, K. R., Ispa, J. M. & Lane, V. J. 2006. Building successful home visitor–mother relationships and reaching program goals in two Early Head Start programs: A qualitative look at contributing factors. *Early Childhood Research Quarterly*, 21: 25–45.

Brown, A.H. 2004. Integrating research and practice in the CSAT Methamphetamine Treatment Project. *Journal of Substance Abuse Treatment*, 26: 103–108.

Bruening, J. E. & Dixon, M. A. 2008. Situating work-family negotiations within a life course perspective: Insights on the gendered experiences of NCAA Division I head coaching mothers. *Sex roles*, 58: 10-23.

Bruening, J. E., Dover, K. M. & Clark, B. S. 2009. Preadolescent Female Development Through Sport and Physical Activity: A

Case Study of an urban after-school program. *Research Quarterly for Exercise and Sport*, 80 (1): 87-101.

- Canda, E. R., Nakashima, M. & Furman, L. D. 2004. Ethical considerations about spirituality in social work: Insights from a national qualitative survey. *Families in society*, 85(1): 27-35.
- Chen, H., Tu, S-P., The, C. Z., Yip, M-P., Choe, J. H., Hislop, T. G., Taylor, V. M. & Thompson, B. 2006. Lay beliefs about hepatitis among North American Chinese: Implications for Hepatitis prevention. *Journal of community health*, 31(2): 94-112.
- Churchill, S. L., Clark, V. L. P., Prochaska-Cue, K., Creswell, J. W. & Ontai-Grzebik, L. 2007. How rural low-income families have fun: A grounded theory study. *Journal of leisure research*, 39(2): 271-294.
- Clare, L., Rowlands, J., Bruce, E., Surr, C. & Downs, M. 2008. 'I don't do like I used to do': A grounded theory approach to conceptualising awareness in people with moderate to severe dementia living in long-term care. *Social Science & Medicine*, 66: 2366-2377.
- Coburn, C. E. 2006. Framing the Problem of Reading Instruction: Using Frame Analysis to Uncover the micro processes of policy implementation. *American Educational Research Journal*, 43(3): 343-379.
- Coristine, R. W., Hartford, K., Vingilis, E. & White, D. 2007. Mental health triage in the ER: A qualitative study. *Journal of Evaluation in Clinical Practice*, 13: 303-309.
- Cox, K., Wilson, E., Jones, L. & Fyfe, D. 2007. An exploratory, interview study of oncology patients' and health-care staff experiences of discussing resuscitation. *Psycho-Oncology*, 16:

985–993.

Curkovic, S., Sroufe, R. & Melnyk, S. 2005. Identifying the factors which affect the decision to attain ISO 14000. *Energy*, 30: 1387–1407.

Curry, L., Gruman, C. & Robinson, J. 2001. Medical estate planning: Perceptions of morality and necessity. *The gerontologist*, 41(1): 34-42.

Danis, W. M. 2003. Differences in values, practices, and systems among Hungarian managers and Western expatriates: An organizing framework and typology. *Journal of World Business*, 38: 224–244.

Dass-Brailsford, P. 2005. Exploring resiliency: Academic achievement among disadvantaged black youth in South Africa. *South African Journal of psychology*, 35(3): 574-591.

De Villiers, A., Koko-Mhlahlo, K. & Senekal, M. 2005. Nutritional well-being of young children in Duncan Village, East London, South Africa: accessibility of primary health care clinics. *Public health nutrition*, 8(5): 520-532.

Deepak, A. C. 2005. Parenting and the process of migration: Possibilities within South Asian families. *Child Welfare*, 84 (5): 585-606.

Documét, P. I., Green, H. H., Adams, J., Weil, L. A, Stockdale, J. & Hyseni, Y. 2008. Perspectives of African American, Amish, Appalachian and Latina Women on Breast and Cervical Cancer Screening: Implications for Cultural Competence. *Journal of Health Care for the Poor and Underserved*, 19: 56–74.

Drisko, J. W. 2001. How clinical social workers evaluate practice.

Smith College studies in social work, 71(3): 419-439.

Duclos, C. W., Eichler, M., Taylor, L., Quitela, J., Main, D. S., Pace, W. & Staton, E. W. 2005. Patient perspectives of patient-provider communication after adverse events. *International Journal for Quality in Health Care*, 17 (6): 479-486.

Durocher, S., Fortin, A. & Côté, L. 2007. Users' participation in the accounting standard-setting process: A theory-building study. *Accounting, Organizations and Society*, 32: 29-59.

Erwin, E. 2002. Adolescent perceptions of relevant social problems. *Journal of Child and Adolescent Psychiatric Nursing*, 15 (1): 24-34.

Farquhar, J. D. & Panther, T. 2008. Acquiring and retaining customers in UK banks: An exploratory study. *Journal of Retailing and Consumer Services*, 15: 9-21.

Ford, K. F., Oberski, I. & Higgins, S. 2000. Computer-Aided Qualitative Analysis of interview data: Some recommendations for collaborative working. *The qualitative report*, 4(3&4): Page numbers not for reference purposes.

Gallagher, M., Pearson, P. & Drinkwater, C. 2001. Managing patient demand: a qualitative study of appointment making in general practice. *British Journal of General Practice*, 51: 280-285.

Georgioua, A., Westbrook, J., Braithwaite, J., Iedema, R., Ray, S., Forsyth, R., Dimos, A. & Germanos, T. 2007. When requests become orders—A formative investigation into the impact of a computerized physician order entry system on a pathology laboratory service. *International journal of medical informatics*, 76: 583-591.

Gibson, P. A. 2002. Care giving role affects family relationships of

African American grandmothers as new mothers again: A phenomenological perspective. *Journal of Marital and Family Therapy*, 28 (3): 341-353.

Gilliam, M. L. & Hernandez, M. 2007. Providing contraceptive care to low-income, African American teens: The experience of urban community health centres. *Journal of Community health*, 32(4): 231-244.

Haddock, S. A., Ziemba, S. J., Zimemrman, T. S. & Current, L. R. 2001. Ten adaptive strategies for family and work balance: Advice from successful families. *Journal of marital and family therapy*, 27(4): 445-458.

Hannon, P. R., Willis, S. K., Bishop-Townsend, V., Martinez, I. M. & Scrimshaw, S. C. 2000. African-American and Latina Adolescent Mothers' Infant Feeding Decisions and Breastfeeding Practices: A Qualitative Study. *Journal of adolescent health*, 26: 399-407.

Harper, G. W., Gannon, C., Watson, S. E., Catania, J. A. & Dolcini, M. M. 2004. The role of close friends in African American adolescents' dating and sexual behaviour. *The journal of sex research*, 41(4): 351-362.

Harper, S. R. 2006. Peer support for African American male college achievement: Beyond internalized racism and the burden of 'acting white'. *Journal of men's studies*, 14(3): 337-358.

Hawthorne, K., Wood, F., Hood, K., Cannings-John, R. & Houston, H. 2006. Learning to mark: a qualitative study of the experiences and concerns of medical markers. *BMC Medical Education*, 6 (25): Page numbers not for reference purposes.

- Higginbottom, G. M. A. 2000. Heart health-associated health beliefs and behaviours of adolescents of African and African Caribbean descent in two cities in the United Kingdom. *Journal of Advanced Nursing*, 32(5): 1234-1242.
- Hilligoss, B. & Rieh, S. Y. 2008. Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context. *Information Processing and Management*, 44: 1467–1484.
- Hongoro, C., Mturi, A. J. & Kembo, J. 2008. Review of national AIDS councils in Africa: Findings from five countries. *Journal of Social Aspects of HIV/AIDS*, 5(4): 192-200.
- Jessup, M. A. 2007. Organizational change in a Perinatal treatment setting: Integration of clinical practice and policies on Tobacco and smoking cessation. *Journal of Psychoactive Drugs*, 39 (4): 461-472.
- Johnston, D. D. & Swanson, D. H. 2006. Constructing the "Good mother": The experience of mothering ideologies by work status. *Sex roles*, 54: 509-519.
- Johnston, D.D. & Swanson, D.H. 2007. Cognitive Acrobatics in the Construction of Worker–mother Identity. *Sex Roles*, 57: 447–459.
- Kegler, M., Rodine, S., Marshall, L., Oman, R. & McLeroy, K. 2003. An asset-based youth development model for preventing teen pregnancy: illustrations from the HEART of OKC project. *Health Education*, 103(3): 131-144.
- Kelly, B. C. 2009. Mediating MDMA-Related Harm: Preloading and Post-loading Among Ecstasy-Using youth. *Journal of Psychoactive Drugs*, 41(1): 19-26.

- Khalifa, R., Sharma, N., Humphrey, C. & Robson, K. 2007. Discourse and audit change Transformations in methodology in the professional audit field. *Accounting, Auditing & Accountability Journal*, 20(6): 825-854.
- Kirk, P., Kirk, I. & Kristjanson, L. J. 2004. What do patients receiving palliative care for cancer and their families want to be told? A Canadian and Australian qualitative study. *British Medical Journal*, 328 (7452): 1343-1349.
- Kotlarsky, J., Van Fenema, P. C. & Willcocks, L. P. 2008. Developing a knowledge-based perspective on coordination: The case of global software project. *Information & Management*, 45: 96–108.
- Kraemer, S. & Carayon, P. 2007. Human errors and violations in computer and information security: The viewpoint of network administrators and security specialists. *Applied Ergonomics*, 38: 143–154.
- Kravitz, R. L., Paterniti, D. A., Hay, M. C., Subramanian, S., Dean, D. E., Weisner, T., Vohra, S. & Duan, N. 2009. Marketing therapeutic precision: Potential facilitators and barriers to adoption of n-of-1 trials. *Contemporary Clinical Trials*, 30: 436-445.
- Kyle, G. & Chick, G. 2002. The social nature of leisure involvement. *Journal of leisure research*, 34(4): 426-448.
- Leake, D. & Boone, R. 2007. Multicultural Perspectives on Self-Determination From Youth, Parent, and Teacher focus groups. *Career Development for Exceptional Individuals*, 30 (2): 104-115.
- Lesser, C. S., Ginsburg, P. B. & Devers, K. J. 2003. The end of an

era: What became of the "Managed care revolution" in 2001?
Health Service Research, 38 (1), Part II: 337-355.

Lipman, T., Murtagh, M. J. & Thomson, R. 2004. How research-conscious GPs make decisions about anticoagulation in patients with atrial fibrillation: a qualitative study. *Family Practice*, 21(3): 290-298.

Loeffler, T. A. 2004. A photo elicitation study of the meaning of outdoor adventure experience. *Journal of leisure research*, 36(4): 536-556.

Lonie, J. M. 2006. From counting and pouring to caring: The empathic developmental process of community pharmacists. *Research in Social and Administrative Pharmacy*, 2: 439-457.

Loxley, W. 2001. Drowning in words? Using NUDIST to assist in the analysis of long interview transcript from young injecting drug users. *Addiction research & theory*, 9(6): 557-573.

Lyerly, A. D., Steinhauer, K., Namey, E., Tulskey, J. A., Cook-Deegan, R., Sugarman, J., Walmer, D., Faden, R. & Wallach, E. 2006. Factors that affect infertility patients' decisions about disposition of frozen embryos. *Fertility and Sterility*, 85(6): 1623-1630.

Martin, A. A., Laurence, C. O., Black, L. E. & Mugford, B.V. 2007. General practice placements for pre-registration junior doctors: adding value to intern education and training. *Medical Journal of Australia*, 186 (7): 346-349.

Martins, L. P. 2007. A holistic framework for the strategic management of first tier managers. *Management Decision*, 45(3): 616-641.

- Massey, L. & Williams, S. 2006. Implementing change: the perspective of NHS change agents. *Leadership & Organization Development Journal*, 27 (8): 667-681.
- McBride, A. M., Sherraden, M. S. & Pritzker, S. 2006. Civic engagement among low-income and low-wealth families: In their words. *Family relations*, 55(2): 152-162.
- McGinnis, P. Q., Hack. L. M., Nixon-Cave, K., Michlovitz, S. L. 2009. Factors that influence the clinical decision making in physical therapists in choosing a balance assessment approach. *Physical therapy*, 89 (3): 233-247.
- McMurray, J. E. *et al.* 1997. Physical job satisfaction. Developing a model using qualitative data. *Journal of general international medicine*, 12(11), 711-714.
- Miller, C.E. & Jezewski, M. A. 2006. Relapsing MS patients' experiences with Glatiramer Acetate Treatment: A phenomenological study. *Journal of neuroscience nursing*, 38(1): 37-41.
- Miller, F.A. Giacomini, M., Ahern, C., Robert, J.S. & De Laat, S. 2008. When research seems like clinical care: a qualitative study of the communication of individual cancer genetic research results. *Bio Med Central Medical Ethics*, 9(4): Pages not for reference purposes.
- Muirhead, W.D. 2000. Online education in schools. *The International Journal of Educational Management*, 14(7): 315-324.
- Myburgh, C. & Mouton, J. 2008. The development of contemporary

chiropractic education in Denmark: An exploratory study. *Journal of Manipulative and Physiological Therapeutics*, 31(8): 583-592.

Myburgh, C. & Mouton, J. 2006. Developmental issues in chiropractic: A South African practitioner and patient perspective. *Journal of Manipulative and Physiological Therapeutics*, 30(3): 206-214.

Myhal, G. C., Kang, J. & Murphy, J. A. 2008. Retaining customers through relationship quality: a services business marketing case. *Journal of Services Marketing*, 22(6): 445-453.

Nesheim, B. E., Guentzel, M. J., Kellogg, A. H., McDonald, W. M., Wells, C. A. & Whitt, E. J. 2007. Outcomes for Students of Student Affairs-Academic Affairs Partnership Programs. *Journal of College Student Development*, 48 (4): 435-454.

Parent, M. M., Olver, D. & Se ´ guin, B. 2009. Understanding Leadership in Major Sporting Events: The Case of the 2005 World Aquatics Championships. *Sport Management Review*, 12: 167-184.

Park, J., Woodrow, S. I., Reznick, R. K., Beales, J. & MacRae, H. M. 2007. Patient care is a collective responsibility: Perceptions of professional responsibility in surgery. *Surgery*, 142(1): 111-118.

Pendleton, S. M., Cavalli, K. S., Pargament, K. I., & Nasr, S. Z. 2002. Religious/Spiritual Coping in Childhood Cystic Fibrosis: A Qualitative Study. *Pediatrics*, 109 (1): Pages not for reference purposes.

Powell, S. & Ennis, S. 2007. Organisational marketing in the creative industries. *Qualitative Market Research: An International*

Journal, 10(4): 375-389.

Pruneau, D., Doyon, A., Langis, J., Vasseur, L. *et al.* 2006. When Teachers Adopt Environmental Behaviours in the Aim of Protecting the Climate. *The Journal of Environmental Education*, 37(3): 3-12.

Prussing, E., Sobo, E.J., Walker, E. & Kurtin, P.S. 2005. Between 'desperation' and disability rights: a narrative analysis of complementary/alternative medicine use by parents for children with Down syndrome. *Social Science & Medicine*, 60: 587-598.

Putnam, W., Bower, K.N., Cox, J., Twohig, P. *et al.* 2006. Quality indicators for cardiac care: national standards in a community context. *Journal of Health Services Research & Policy*, 11(1): 5-12.

Robertson, D. W. 1996. Ethical theory, ethnography, and differences between doctors and nurses in approaches to patient care. *Journal of medical ethics*, 22: 292-299.

Sambell, K., McDowell, L. & Brown, S. 1997. "But is it fair?": An exploratory study of student perceptions of the consequential validity of assessment. *Studies in Educational Evaluation*, 23(4): 349-371.

Samuel-Hodge, C. D., Headen, S. W., Skelly, A. H. & Ingram, A. F. *et al.* 2000. Influences on day-to-day self-management of type 2 diabetes among African-American women. *Diabetes Care*, 23(7): 928-933.

Scheepers, R., Scheepers, H. & Ngwenyama, O.K. 2006. Contextual influences on user satisfaction with mobile computing: findings from two healthcare organizations. *European Journal of*

Information Systems, 15: 261–268.

Schrimshaw, E. W., Siegel, K. & Lekas, H-M. 2005. Changes in Attitudes Toward Antiviral Medication: A Comparison of Women Living with HIV/AIDS in the Pre-HAART and HAART Eras. *AIDS and Behaviour*, 9(3): 267-279.

Schure, M. B., Christopher, J. & Christopher, S. 2008. Mind-Body Medicine and the Art of Self-Care: Teaching Mindfulness to Counselling students through yoga, meditation and qigong. *Journal of Counselling and Development: JCD*, 86 (1): 47-86.

Sheridan, S. L., Behrend, L., Vu, M. B., Meier, A., Griffith, J. M. & Pignone, M.P. 2009. Individuals' responses to global CHD risk: A focus group study. *Patient Education and Counselling*, 76: 233-239.

Simpson, M. 2003. The relationship between drug use and crime: a puzzle inside an enigma. *International Journal of Drug Policy*, 14: 307–319.

Spear, S. E., T, Brown, A. H., & Rawson, R. A. 2005. Painting a picture of the client Q: Implementing the Addiction Severity Index in community treatment programs. *Journal of Substance Abuse Treatment*, 29: 277– 282.

Sroufe, R., Curkovic, S., Montabon, F. & Melnyk, S.A. 2000. The new product design process and design for environment ``Crossing the chasm''. *International Journal of Operations & Production Management*, 20(2): 267-291.

Steele, J. R. 1999. Teenage sexuality and media practice: Factoring in the influences of family, friends and school. *The journal of sex research*, 36(4): 331-341.

- Stewart, T. & Richardson, G. 2004. A qualitative study of therapeutic effect from a user's perspective. *Journal of fluency disorders*, 29: 95-108.
- Sugai, P. 2005. Mapping the mind of the mobile consumer across borders An application of the Zaltman metaphor elicitation technique. *International Marketing Review*, 22(6): 641-657.
- Taniguchi, S., Widmer, M., Duerden, M. & Draper, C. 2009. The Attributes of Effective Field Staff in Wilderness Programs: Changing Youth s' perspective of being "cool". *Therapeutic Recreation Journal*, 43(1): 11-26.
- Venter, A. & Barkhuizen, N. 2005. Rethinking undergraduate curricula: A delphi study of human resource management and industrial & organisational psychology. *SA Journal of Industrial Psychology*, 31 (3): 46-53.
- Walker, A. & Hutton, D. M. 2006. The application of the psychological contract to workplace safety. *Journal of Safety Research*, 37: 433-441.
- Weigle, S. C. & Nelson, G. L. 2004. Novice tutors and their ESL tutees: Three case studies of tutor roles and perceptions of tutorial success. *Journal of second language writing*, 13: 203-225.
- Weischedel, B., Matear, S. & Deans, K. R. 2005. A qualitative approach to investigating online strategic decision making. *Qualitative Market Research: An International Journal*, 8(1): 61-76.
- Whiting, J. B. & Lee, R. E. 2003. Voices from the system: A qualitative study of foster children's stories. *Family relations*, 52 (3): 288-295.

- Williamson, D. L., Stewart, M. J., Hayward, K., Letourneau, N., Makwarimba, E., Masuda, J. Raine, K., Reutter, L., Rootman, I. & Wilson, D. 2006. Low-income Canadians' experiences with health-related services: Implications for health care reform. *Health Policy*, 76: 106–121.
- Wint, E. & Frank, C. 2006. From "poor" to "not poor": Improved understandings and the advantage of the qualitative approach. *Journal of sociology and social welfare*, 23(1): 163-177.
- Young, H. M., McCormick, W. M. & Vitaliano, P. P. 2002. Attitudes toward community-based service among Japanese American families. *The Gerontologist*, 41(6): 814-825.
- Zanchetta, M. S., Perreault, M., Kaszap, M. & Viens, C. 2007. Patterns in information strategies used by older men to understand and deal with prostate cancer: An application of the mode 'lisation qualitative research design. *International Journal of Nursing Studies*, 44: 961–972.