

The Enlightened Chinese Characters

A Cognitive Approach of Computer Assisted Chinese Character Learning

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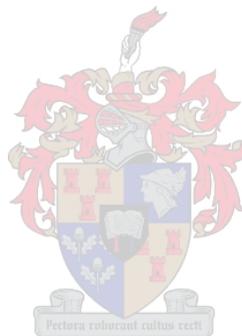
April 2006

DECLARATION

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

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ABSTRACT

With continuing advances in technology, computer-assisted instruction provides opportunities for individualized, interactive learning. In this research paper, I employed the theoretical framework of CALL and the philosophy of cognitive psychology to promote learner autonomy in the second language acquisition of Chinese. In the area of CSL (Chinese as a second language), computers are seen to be a highly motivating, instructional tool.

The research on my project focuses on assisting learners to learn and memorize Chinese characters through a web developed application which can serve as supplementary material for learners and instructional material for lecturers. Multi-dimensional aspects have been employed in the web application, such as the origins, history, transformation stages, structures of Chinese characters, as well as the background of simplified Chinese characters.



KEYWORDS

Cognitive Learning Theory (CLT), Constructivism, Computer-Assisted-Learning (CALL), Short Term Memory (STM), Long Term Memory (LTM), Learner Autonomy (LA), Multimedia Design

OPSOMMING

Tegnologiese vooruitgang het interaktiewe, rekenaar gebasseerde onderrig vir die individu moontlik gemaak. Die teoretiese raamwerk van rekenaar gebasseerde onderrig asook die filosofie van kognitiewe sielkunde is in hierdie navorsing geïmplementeer ten einde die leerder se vermoë om die tweede taal aan te leer te bevorder. Bevindings toon dat rekenaar hoogs motiverende onderrigmedia is wat ook met die aanleer van Chinees as tweede taal effektief gebruik kan word.

Navorsing vervat in hierdie projek fokus op metodes om studente by te staan met die aanleer en memorisering van Chinese karakters deur gebruik te maak van web-gebaseerde programmatuur. Hierdie programmatuur kan as aanvullende materiaal vir studente of as onderrigmateriaal vir dosente dien. Multi-dimensionele aspekte is in die programmatuur geïmplementeer wat, onder andere, die oorsprong, geskiedenis, oorgangsfases en strukture van Chinese karakters asook die agtergrond van vereenvoudigde Chinese karakters insluit.



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CHAPTER 1: BACKGROUND

1.1 Research Rationale

In recent years, Chinese language learning has been one of the fastest growing fields in second language education in the world. According to the researcher's survey, the emergence of China as a key player in the new global economy and the economic successes of Taiwan, Hong Kong and Singapore, has resulted in students noticing the potential of the Chinese language to develop rapidly in all fields in the future.

"In France, Chinese has become the foreign language with the fastest development in high schools. From 1994 to 2002, students who chose to study Chinese in the Paris school arrondissement rose by 170 percent. From 2000 to 2002, students who opt for Chinese increased by 30.28 percent. At the beginning of 2003, some 7, 600 students made Chinese study their first choice." (Embassy of the People's Republic of China in Australia, 2004) and "reports said more and more universities in Egypt have regarded the Chinese language as one of the most important languages in the world." (China Internet Information Centre, 2002)

When asked to rank foreign languages in terms of their contribution to global communication, 40 of the first and second year Chinese language students at the University of Stellenbosch in South Africa put Chinese in first place (37 of 40, i.e. 90%). This was much higher than other major languages (Spanish (2 of 40, i.e. 5%), French (2 of 40, i.e. 5%), German (0 of 40, i.e. 0%). (See Appendix I for questionnaire). "The world's growing demand for the Chinese language, which has never happened before, tells the world's prediction for China's future. Countries in the world are actively seeking for help and assistance in Chinese language teaching." (Embassy of the People's Republic of China in Australia, 2004) Needless to say, knowledge of the Chinese language has been, and will continue

to be, an invaluable asset for students in an increasingly intensified global environment.

1.2 Problem Statement

Chinese has been one of the most difficult languages to learn largely because of the pictographic nature of its written characters. For example, if the character, 日 (sun), that is made up of 4 strokes, an extra stroke was added by mistake, making it 目 (eye), it would change the entire meaning of that character. There is also no assistance of an alphabet which makes it even more confusing to those who are used to the Roman alphabetical system. Therefore, the development of students' capabilities in writing Chinese characters remains a major problem in the instruction of the language. This causes frustration for many students while they learn the language, and discourages others from pursuing studies beyond the first year. In his ground-breaking book *The Chinese Language: Fact and Fantasy*, John DeFrancis estimates that if learning to speak Chinese is about five percent more difficult than learning to speak French, then learning to read Chinese is about five times as hard as learning to read French (DeFrancis, 1984). This appears to be true at the University of Stellenbosch, in my own teaching, and even at the Chinese school in Cape Town, South Africa. Given the inherent difficulty of writing Chinese characters, a student can only learn a limited number of Chinese characters within a specific period of time, which inevitably hampers his/her progress in achieving overall proficiency in the language. This problem is by far the greatest hindrance, not only to students who study Chinese as a second language, but also to those mother tongue Chinese speakers who already possess certain oral/aural proficiency and would otherwise be able to make rapid and comprehensive progress in all language skills if not for their lack of competence in character writing.

In my research survey of students studying the Chinese language at the University of Stellenbosch, as well as with my private students, the results indicate that the

level of difficulty of the character writing is higher than the pronunciation of Chinese and the reading of Chinese texts. From my own observation and consultation with my students (South African born Taiwanese children, Koreans and local South African adults), it was found that many of them who dropped Chinese after the first year of study complained about the amount of time dedicated to character writing.

1.3 Theoretical Framework

The framework is a reflection of the researcher's mind map of this research paper and the order of the headings go with the research problem logic accordingly. Chapter 1 introduces the reader to this research paper and gives the background of the researcher's teaching experiences. Chapter 2 reveals the literature which related to the researcher's interests and can help to formulate a specific research problem. Chapter 3 the researcher introduces the methodology that was used during the whole research process and as well as the design concepts of the web application in chapter 4. Chapter 5 concludes the whole research paper and provides further recommendations for any future research.

I also address a few issues and frequently asked questions that most students may encounter during the process of learning the Chinese language. The issues include different Chinese phonetic systems, Chinese grammatical structures and the memorization of Chinese characters.

1.4 Project Design

There are numerous web applications and e-learning programmes in Chinese language learning. They focus mainly on listening, writing, vocabulary, pronunciation, grammar, and conversation. However, there are few people that have focused on developing a program which teaches learners *the way* and *why* these Chinese characters have been created. According to my experience in teaching Chinese, I have discovered that it is easier for students to learn how to write Chinese words if the history and origins of the words were understood. This

will be discussed further in Chapter 3. This project is designed to help students develop their character writing capability at the same rate as the development of their other language skills, thereby achieving an accelerated development of their overall proficiency. I have not yet come across any other CALL Chinese language programs that use this method of combining the origins of the characters with the structure in order to create a more efficient and powerful understanding for the learner. In other words, this method, used within my program, shows the cause and effect and the stages of evolution of the Chinese characters.

1.5 Researcher's Experience

Usually characters are acquired as isolated individual items that happen to be present in a given context, and the learner is subjected to absorbing many characters of diverse complexity with respect to form and meaning. As such, the main focus of attention is on the story (storyline or explanation of the characters), while character learning is secondary and incidental. Traditionally, the teacher always emphasises the proper stroke order of writing. It is not uncommon for a character to be copied 50 or 60 times or more. A more efficient way of teaching is needed, since thousands of characters must be learned and used. However, the standard answer has been, "But, this is the traditional way it has been taught for thousands of years!", as if to say, "Who are we to question it? It is the only way we know; therefore, it must be right".

From my own teaching experience, when the students find it difficult to memorise the Chinese character writing I will always show them the original form of the Chinese characters, or how the word was created with the phonetic part and the meaning. The learners feel that this is easier to learn as the original form of the Chinese characters often involved drawings and it is less work when they know how the characters are associated with the meanings. By illustrating on a black board the characters together with visual drawings and the way they were created, a two-way communication system (physically and mentally) is created, whereby the

learners have an image in their mind and they can start putting all the parts together to form the characters in their minds while the eyes follow the sequence of the strokes and thus come up with questions during the learning process.

1.6 Process of Chinese Character Learning

The process of learning Chinese characters is about comprehension, the role of memory and lexical learning, which strongly associates with a psychological cognitive approach. Fortunately, much progress has been made in cognitive psychology during the last decade. The science of cognition attempts to understand the nature of human intelligence and how people think. Together with the concepts of CALL (Computer Assisted Language Learning), I hope that this thesis will assist many Chinese language learners in the learning process.

Personally, I believe that this approach, if widely adopted, will bring about broad changes in the entire field of Chinese language instruction, especially in areas such as textbook compilation, classroom teaching techniques, and curriculum innovation.



1.7 Hypothesis

The study will research the following hypothesis: Combining the origins of the Chinese characters with the structure and historical background of the characters will create a more efficient understanding of Chinese.

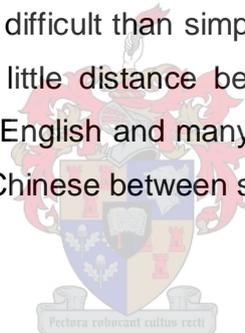
1.8 Purpose of this research

The purpose of this research is to facilitate the learning of Chinese characters for Chinese language learners through designing and implementing a computer-assisted learning system on a PC. With the use of animation and graphics the origins and history of Chinese characters are introduced to the learner. Moreover, the understanding of these concepts is deepened by means of demonstration and

practice to help enlarge the learner's vocabulary and knowledge on the Chinese characters, history and culture.

1.9 Summary

A Chinese language learner appears to be dealing with two entirely different systems, spoken Chinese and written Chinese, with no direct phonetic linkage between them. Even if one can speak a Chinese word, one is still far from being able to read it when it appears as a character. The specific combination of strokes has to be remembered before one can fully recognize it as a word with a particular meaning and pronunciation. Furthermore, even if one can read a Chinese character, one is still far from being able to write it. Writing such a character means that one has to be able to reproduce all the necessary strokes in their correct order, which is far more difficult than simply recognizing the character on a page. Clearly, while there is little distance between speaking and reading or between reading and writing in English and many other phonetic languages, there is a tremendously large gap in Chinese between speaking, reading, and especially, writing.



CHAPTER 2: THEORETICAL FRAMEWORK

2.1 Introduction

The learning of Chinese characters has three aspects: 1. recognition of characters, 2. acquisition of characters i.e. retaining them in the memory, and 3. use of characters. The first two aspects are the basics for beginners and are therefore the fundamental concerns of my research programme. The third aspect is more advanced and can be difficult to learn but through the use of technology one is able to enhance the learning process because it allows the learner to engage in interactive learning and gives a lot of sensory stimulation, especially visual stimulation.

Research on the role of technology in teaching and learning has been conducted for many years. There are two typical views about this issue in the field of educational technology. One of them is that technology plays an important role in teaching and learning; it will enable the learners to learn more efficiently and effectively (Liu, 2000). The other view is that technology itself will not influence the result of learning and teaching. (Clark, 1983; Clark 1994) Clark used an analogy to explain his position on the latter view by comparing instructional media to vehicles that deliver instructions but do not affect the learners' results any more than a truck that delivers our groceries can have any influence on our nutrition (Clark, 1983).

Similar debates also exist in the attitudes towards the application of modern technologies in Chinese teaching and learning. While some instructors and institutions are very enthusiastic to embrace computers and the Internet into Chinese teaching, others are lukewarm about using them and even sceptical. Based on my experience of teaching Chinese as a foreign language, I think that whether certain media are effective in teaching and learning or not, depends on the way we use them; and before that we should find out their potential.

In this chapter, Foreign Language Teaching (FLT) will be introduced firstly, serving as an introduction followed by the advantages that Computer Assisted Language Learning (CALL) can bring and has already brought to Chinese teaching and learning and how CALL intertwines with the theory of Foreign Language Teaching (FLT). Last but not least, the functioning of the mind during the learning process will be discussed.

2.2 Theory on Constructivist Foreign Language Teaching (FLT)

2.2.1 Introduction

Language learning has often been described as one of the most impressive mental operations of the human mind in view of the complexity of grammatical structures and multiple functionality learners of any language are confronted with. In other words, learning should be regarded as a process of information gathering and knowledge processing.

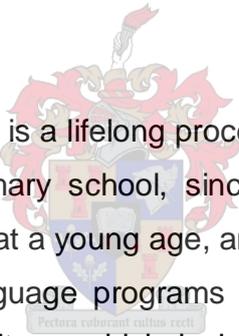
The importance of combining language pedagogy with technology, such as in CALL cannot be overemphasised enough as this can help to strengthen the learning process while advancing with the technological times of today. I will begin the discussion by focusing on Foreign Language Teaching. I will outline what I have found to be some of the most fundamental pedagogical principles for language teaching. While language pedagogy has seen continuous changes over the years as well as a wide range of beliefs and opinions at any particular time, the present paper takes foreign language teaching, learner autonomy and constructivism to be among the central principles of today's language teaching and will be discussed later.

2.2.2 Foreign Language Teaching

As far as foreign language learning is concerned, research into language learning and acquisition processes suggest that mere training in structural (grammatical) and vocabulary knowledge will not result in real linguistic competence and

language proficiency. Learning a second language can be facilitated by including cultural information as a supplement. The creation and evolution of Chinese characters are closely interwoven with the development of Chinese culture. Chinese characters are the basic carriers of the traditional Chinese culture and, as an important role for extending, spreading and exchanging ideas, they have played a critical role in the long history of the Chinese nation. (Yin & Rohsenow, 1994).

Learning a second language develops communicative competence, strengthens reading and writing skills, and opens the door to the deeper understanding of and appreciation for the richness of diverse cultures. The following principles highlight the most important ideas that should inform the design of all foreign language programs:

- 
1. Language acquisition is a lifelong process. Foreign language programs should begin in primary school, since language acquisition is more easily accomplished at a young age, and continue beyond grade twelve.
 2. Effective foreign language programs integrate the study of language with the study of culture, which includes daily life, history, literature, visual and performing arts, mathematics, and science. In this way, foreign language programs create natural links to all other disciplines.
 3. Assessment of student learning is an integral component of effective foreign language instruction.

(Massachusetts Department of Education, n.d.)

2.2.3 Learner Autonomy

There is broad agreement in the theoretical literature that learner autonomy grows out of the individual learner's acceptance of responsibility for his or her own learning. (Little, 1991) This means that learner autonomy is a matter of explicit or

conscious intention: we cannot accept responsibility for our own learning unless we have some idea of what, why and how we are trying to learn.

Learner autonomy has been interpreted as freedom from the control of the teacher, freedom from the constraints of the curriculum, even freedom to choose not to learn. Each of these freedoms must be confronted and discussed in any serious consideration of learner autonomy. (Schwienhorst, 1997)

The term autonomy focuses attention on individuality and independence; it is sometimes assumed that learners make the best and fastest progress when they work on their own. However, this is inaccurate. We are social beings, and as such we depend on one another in an infinite number of ways. Therefore autonomy does not mean social isolation.

To all intents and purposes, the autonomous learner takes a (pro-) active role in the learning process, generating ideas and availing himself of learning opportunities, rather than simply reacting to the various stimuli of the teacher. (Schwienhorst, 1997). As we shall see, this line of reasoning operates within and is congruent with, the theory of constructivism. The autonomous learner is a self-activated maker of meaning, an active agent in his own volition which causes things to happen. Learning is seen as the result of his own self-initiated interaction with the world. The following is a brief summary of the main attributes which characterise autonomous learners:¹

Autonomous learners:

1. have insights into their learning styles and strategies;
2. take an active approach to the learning task at hand;
3. are willing to take risks;

¹ . This summary is a personal list compiled by the researcher of the main attributes which characterize autonomous learners.

4. are good guessers;
5. attend to form as well as to content, place importance on accuracy as well as appropriacy;
6. have a tolerant and outgoing approach to the target language.

2.2.4 Constructivism

Learning should be an active process in which learners construct new ideas based upon their current and past knowledge. Constructivism emphasizes a proactive view of the individual, who as a learner participates actively in various tasks and activities in order to complement their learning. The following are the principles of constructivism to FLT (Wolff, 1994):

- I Action-orientedness
- I Learner-centredness
- I Process-related awareness
- I Holistic language experience

Action-orientedness includes cooperative learning, i.e. social forms of learning such as working with partners or in groups. Learner-centredness emphasizes the individualisation of learning; however, learners are not social islands. They exist in a cultural context with others and not simply in isolation. The individual learner should be allowed to choose his own selection from exercises and texts presented to him. This choice is in line with the principle of learner autonomy. Learning awareness, language awareness and intercultural awareness should be part of process-related awareness. Awareness raising is one of the major aims of a learning scenario based on the constructivist theory, particularly in view of the constant integration of new technologies into the day-to-day life of the knowledge society. Another major principle of constructivism is the holistic language experience which links up to content-oriented FLT. According to this approach, foreign language acquisition will thrive in an authentic and complex learning

environment or situation. (Wolff, 1994) Wolff (1994) believes that the constructive approaches will form a suitable basis for a coherent theory of cognition, perception, and learning and will provide a foundation for FLT.

2.2.5 Summary

Over the past decade, language learning theory has seen a shift from the highly guided to the more open learning environment with constructivism as a new and very much learner-centred paradigm for learning. Learning is seen as a self-structured and self motivated process of knowledge construction and the learner is regarded as a self-governed creator of knowledge.

2.3 Computer Assisted Language Learning (CALL)

2.3.1 Introduction

Computer Assisted Language Learning (CALL) is often perceived, somewhat narrowly, as an approach to language teaching and learning in which the computer is used as an aid to the presentation, reinforcement and assessment of material to be learned, usually including a substantial interactive element. Levy (1997) though defines CALL much wider as “the search for and study of applications of the computer in language teaching and learning”. (Levy, 1997, p. 1)

2.3.2 A Brief History of CALL

CALL's origins can be traced back to the 1960s. Up until the late 1970s CALL projects were confined mainly to universities, where computer programs were developed on large mainframe computers. The PLATO project, initiated at the University of Illinois in 1960, is an important landmark in the early development of CALL. In the late 1970s, the arrival of the personal computer (PC) brought computing within the range of a wider audience, resulting in a boom in the development of CALL programs and a flurry of publications. Early CALL favoured an approach that drew heavily on practices associated with programmed instruction. This was reflected in the term Computer Assisted Language Instruction

(CALI), which originated in the USA and was in common use until the early 1980s, when CALL became the dominant term. Throughout the 1980s CALL widened its scope, embracing the communicative approach and a range of new technologies. CALL also established itself as an important area of research in higher education. (Levy, 1997, p. 53)

2.3.3 CALL vs. Pedagogy

Pedagogical work in CALL typically means adopting and adapting existing technology-based materials or learning environments to a specific course or learning program. Off the shelf software can rarely be used without modification. Usually, significant customization and expansion are needed to integrate technology into the curriculum in a way that maximizes learning opportunities and language exposure. Therefore, pedagogical innovations require the instructors to be proficient not only in the pedagogy but to be knowledgeable about current technological applications and tools as well. Another important way of integrating technology into powerful learning environments is to put the tools of creation into the students' hands, designing instructional units that channel student creativity into effective language learning activities. Under an instructor's skilful guidance, students can gain valuable language practice while they develop cultural websites, create digital video class projects, and establish contacts with students in other cities and countries through internet-based, multi-user, interactive environments. It is in these pedagogically innovative environments that researchers investigate how technology-based learning affects the language acquisition process.

The use of technology has to be guided by pedagogy. Otherwise, even an acknowledged strength of the technology can be mis-used. Pedagogy also has to be the reason behind the application of technology. Otherwise, the use of technology may well be gratuitous.

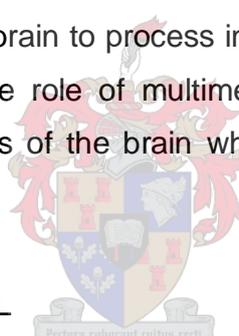
The teacher's role will vary according to whether the computer is acting as a tutor or as a tool. As tutor, the flexibility of the computer lies in the fact of providing language instruction when a teacher is not available. This flexibility can allow learners to learn at a time, place and pace that suits them. As tool, the computer is designed to assist the teachers, so that tasks may be accomplished more efficiently and more effectively with the aid of the tool than without it. "The human is in direct control of the tool. The tool itself is quite neutral in terms of how it is used, and it can equally be used" (Levy, 1997, p. 208) The computer can play both roles as it is well-established and has been changed and improved according to the needs of human beings. CALL programs should be designed in a way that can suite the CALL methodology and therefore benefit the students.

"With the computer as the tutor the materials are designed to be self-contained and to be used in a stand-alone way without the teacher present." (Levy, 1997, p. 211 & 212) Although lacking a sense of teacher presence, there are a number of advantages to the learning environment described here. First of all, while tutorials and self-study courses are not open ended systems and their usefulness does not last beyond the materials covered, a facilitative learning environment can have longer life-spans. Secondly, these above mentioned tools can be flexibly integrated with any curriculum. Thirdly, "learner characteristics can be accommodated by the mechanisms in the computer program itself and through allowing the student control over pace, content, and learning styles." (Levy, 1997, p. 205) In the case of the computer as tutor, the teacher's fear of being displaced by the computer arises. Here the central issue concerns delegation of control to the computer. The teacher's and the computer's roles need to be carefully confined within the tutor framework and the tasks ultimately assigned to the computer will need to be carefully examined, especially as computers become more accomplished as intelligent tutors.

2.3.4 CALL in Chinese Characters learning

“According to scientific research conducted in the 1980s, learning Chinese characters requires both left and right brain functions, since characters are processed in two phases.” (Yu, 2005, p. 19) In her research study Yu also indicates that the right brain has a stronger ability in processing character shape (morphs), while the left brain is relatively better in the sound (phonetics) and meaning (semantics). The process of learning Chinese characters requires the acquisition of the three characteristics which implies that both hemispheres of the brain will be engaged during the process of learning Chinese characters.

“a multimedia package that incorporates both left-brain and right-brain activities can increase learning and retention as compared to a package limited to materials that require only on side of the brain to process information” (Yu, 2005, p. 19) Yu’s (2005) research shows that the role of multimedia could enhance the learning process by engaging both sides of the brain which can assist the learner in the retention of new knowledge.



2.3.5 Limitation of Chinese CALL

The following are factors that influence the application of modern technology to Chinese teaching and learning:

1. Teachers are not familiar with modern technology.

Although most Chinese teachers know how to use a Chinese word-processor and use them in Chinese teaching and learning, not all of them are familiar with multimedia technology and the Internet. (Masheng, 2000). This is true especially in Mainland China. The limited knowledge about modern technology constrains them from doing research on applying the available technology and products into their teaching.

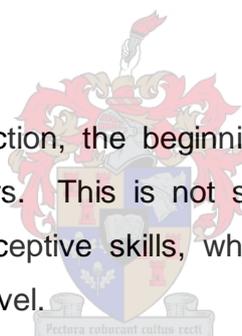
2. Time and money constrain teachers from using technology well.

Taking Mainland China as an example, some teachers have realized that the appropriate application of modern technology will improve Chinese teaching and learning; and they are also eager to apply it into their teaching. They do however find it difficult to do so. Collecting and selecting the appropriate multimedia products and using the Internet resources cost time and money. Most schools have not taken any measures to encourage teachers to do so. (Liu, 2002)

I think that schools should implement a program to encourage teachers to learn more about modern technology, and support them with the necessary technical services in order to make the teaching and learning process become more sufficient and productive.

2.3.6 Conclusion

In terms of the level of instruction, the beginning level has attracted the most attention from CALL developers. This is not surprising either, considering the disproportional attention on receptive skills, which are more basic and closely associated with the beginning level.



The most common areas addressed by CALL are pronunciation, vocabulary and characters. These time-consuming but less creative tasks turn out to be what the computer is best suited for. Not only can these tasks take advantage of the consistency and patience of the computer, they can also capitalize on its data-handling and multimedia capabilities.

Computer Assisted Language Learning (CALL) programs that attempt to address the needs of individual learners have received some unfavourable criticism, particularly in ways in which the computer may inhibit or constrain the learner through inappropriate or inflexible control mechanisms. Nevertheless, the computer has strengths in its flexibility to provide language learning opportunities

when a teacher is not available and at the learner's convenience. For students attending a regular language class, the computer tutor can provide valuable supplementary work, especially extra language practice.

2.4 Cognitive Language Teaching (CLT)

2.4.1 Introduction

Human development includes physical growth and maturation; the development of cognitive capabilities for thinking, learning, remembering, problem solving, and social and emotional development, which includes developments in moral reasoning. All these areas of human development continually interact. In the developing child, for example, learning to use language is a continuing process that is simultaneously physical, cognitive, and social. Cognitive learning theorists believe that events occurring within the learner are just as important for understanding learning as the environmental events external to the learner. The term cognition has to do with the act of knowing. Therefore, cognitive theorists conceive of learning in terms of the acquisition of knowledge in all aspects.

Piaget's view of cognitive development, introduces not only stages of development but also the experiences and mental processes that are associated with this development. In contrast, Vygotsky's theory of cognitive development emphasizes social and cultural origins. The science of cognition is dominated by the information processing approach, which analyzes the cognitive process into a sequence of ordered steps. Basic processes involved in human thinking, such as attention or memory, are the focus of the information-processing theory. I would like to infuse this body of knowledge with that of Chinese orthography.

2.4.2 Piagetian vs. Vygotskian Constructive View

Piaget and Vygotsky represent fundamental positions on teaching and learning and are most helpful in distinguishing key differences in perspective, particularly in the ways in which the roles of the teacher and the computer are perceived. Further

they are both regarded as constructivist, and as this orientation currently represents the dominant approach in educational multimedia design, their views are of special interest (Boyle, 1997). Both Piaget and Vygotsky are concerned with how the individual learner learns and constructs knowledge using his or her own cognitive apparatus. They are both seen as constructivist because of their emphasis on the ways in which the learner constructs his or her own understanding and makes sense of the surrounding environment. However, beyond this area of agreement, Piaget and Vygotsky differ considerably in how they see a learner's cognitive mechanisms working.

Piaget (1896-1980), generally regarded as the founder of constructivism, typically sees the learner as a lone, inventive scientist trying to make sense of the world (Piaget, 1980; Phillips 1995). He argues that knowledge does not simply result from the passive recording of observations, but that it comes from an active and constructive learning process. In this way, he stresses the fact that the learner is both mentally and physically active in adapting to the complexities of the world (Jones and Mercer, 1993). His conception of the learner is highly individualistic and pays little attention to social processes.

In contrast, Vygotsky (1886-1934) suggests that such a view of learning is inadequate, and that social transaction not solo performance is the important part of education. Vygotsky and his followers emphasise the social factors that influence learning. Vygotsky did not consider that learning arose out of acting on and adapting to some impersonal world, as did Piaget, but rather that it resulted from engagement with others. (Vygotsky, 1978)

Acquiring a language enables the learner to think in new ways by providing a cognitive tool for making sense of the world through interaction. Neither theorist, however, had much to say about how thought and learning occur in the brain. One theoretical model of what happens in the brain is the *information-processing theory*,

which describes how children and adults operate on different kinds of information. How do people see, store, and retrieve information for later use.

2.4.3 Information-processing theory

The Information-processing theory derives not from the work of a single individual but from a school of thought that applies a computer metaphor to human thinking. (McCown, Driscoll & Roop, 1992). As computers have evolved in complexity, so has the information-processing theory. Initially thought of as a linear process, information processing is now conceived in terms of multiple and simultaneous linkages, or neural networks, that develop during learning and account for memory.

Increasing attention is the process used to focus on one or more aspects of the environment to the exclusion of the other. As they develop, a child's ability to store, remember, and use information changes. They can solve increasingly complex problems involving more operations to be kept in mind. The total amount of memory capacity available does not increase as children mature; what changes is how the space in the memory structure is used. (McCown, Driscoll & Roop, 1992). In this view, learning is a matter of inputting information from the environment, transforming it for storage in memory, and then retrieving it from the memory to produce a response.

2.4.4 Chinese Characters & Cognitive Psychology

Perception:

In terms of "form", a Chinese character is a meaningful unit of information which is 2-dimensional in nature. But, when actively looking at a character, just how does one perceive it? Is it by tracing out the character stroke-by-stroke the way the native Chinese learn it, or by some other means?

In essence, we are asking how the visual information from a character is perceived, and how perceptual patterns of a character are formed. In order to answer these more general questions, we need to have the specifics regarding the following:

1. Sensory memory: how does it work when actively looking at a character?
2. Attention: what is its nature, and its role in information storage?
3. Pattern recognition: what are the features of a character?

A series of eye movement studies was conducted by F.C. Sun & L. Stark (Humboldt State University, n.d.) at the University of California, Berkeley, to determine how the eye moves while looking at Chinese characters. The eye movement measurement used the scleral reflection technique and two kinds of characters were used, namely: simple and compound characters, and two types of subjects were employed, namely: beginners and experts. The beginners were non-Chinese college students of the University of California, Berkeley, with 2 to 3 years experience in studying the Chinese language, while the experts were native Chinese scholars. A brief summary of the result of the eye movement experiment was described as following. Two test characters, “口” (mouth) and “靈” (spirit) were chosen. The result on “口” clearly shows that the eye does not move according to the stroke order at all. By imposing both characters, the result shows that the eye tends to dwell at the center of a given sub-feature of the characters, namely, “口” (mouth). In other words, the eye moves in such a way that it dwells, not according to the stroke order of a character, but somewhat corresponding to the center of the sub-features of the formal elements of the tested characters.

I Sensory Memory

When a character is first seen by a person, it is registered in the sense organ of perception, and then recorded in the sensory memory (Sigelman & Rider, 2003). Sensory memory possesses two important characteristics: 1. *capacity*, one can

hold a great deal of information, but 2. *duration*, one can hold it only for a brief period of time.

Consider the character “靈” (spirit), if the individual strokes were used as the basic information units, then it would take about 10 seconds to trace out the 24 strokes. This is simply too long a time duration. But if the same character is represented by the three meaningful sub-parts, “雨” (rain), “口” (mouth) and “巫” (magic incantation), then 3 units of meaningful information can easily be held in less than one second.

I Attention

The sensory memory is also called Very-Short-Term-Memory (VSTM) (Sigelman & Rider, 2003), in which the information is lost if not quickly attended to. Thus, “attention” plays an important role in selecting sensory information for further processing. (Sigelman & Rider, 2003) Attention is a very limited resource because generally one does not have the capacity to perform two demanding tasks simultaneously. But, tasks that are practiced to the point of perfection require little or no attention, and thus can be performed simultaneously.

I Pattern Recognition

Consider the example character, “靈” (spirit) one will remember the character better, if the character is presented by few meaningful parts. Therefore it would be more economic and efficient if the Chinese characters are recognized in patterns then strokes. That is, learners identify patterns by processes that recognize feature configurations. I would like to make a presumption, if the pattern is familiar, the stimuli will be recognized automatically without the intercession of “attention”. But, if the pattern is unfamiliar, then one will need to pay more attention to synthesize the features into a pattern.

Chinese characters are rich in images; some characters are even pictorial. But, a character in modern script differs from a picture in that a traditional form of a character can be segmented into meaningful pieces. For example, the character “旦” (dawn) is segmented into two meaningful pieces: the “日” (sun) and “一” (horizon). Thus, some Chinese characters are abstract analogy representations of objects.

2.4.5 Short-Term Memory (STM) & Long-Term Memory (LTM)

How does the human memory work? What is short-term memory (STM), and long-term memory (LTM)? What is remembering? These questions will now be considered with particular reference to the learning of Chinese characters.

Short-term memory (STM) is one of the stages of information processing, along with sensory memory and long-term memory. Short-term memory holds the information a person is working on at any point in time - the information residing in a person's consciousness. An important characteristic of short-term memory is its limited capacity. A person can only deal with a limited amount of information at any given moment, but this capacity increases during cognitive development.

Long-term memory (LTM) is considered to be the permanent storage of the human information-processing system. Some of the items in the STM may be permanently stored in the LTM during information-processing. For example, a person may be more likely to encode a telephone number into long-term memory if it is rehearsed and of importance, whereas a person is less likely to remember a telephone number of little significance. LTM houses many different kinds of information: episodes that you have experienced in childhood, facts, abstract rules that allow you to understand language, strategies for solving problems, smells, sounds, tastes, feelings, and visual images. (McCown, Driscoll & Roop, 1992) The most common way of memorising or encoding information is by rehearsal,

which may take the form of simple repetition or more elaborate means which involve the association of meaning to what is to be remembered.

The *connectionist* approach to learning has been around for some time, but it is only recently that advances in computer technology have given it a new breath of life. "Connectionism likens the brain to a computer which would consist of neural networks, complex clusters of links between information nodes. These links or connections become strengthened or weakened through activation or non-activation respectively." (Mitchell & Myles, 1998, p. 79) The human mind is predisposed to look for associations between elements and create links between them. These links become stronger as these associations keep recurring, and they also become part of larger networks as connections between elements become more numerous.

As far as language is concerned, memory is particularly important in learning a language. One of the main problems Chinese language learners face is memorising the characters. Since there are many characters that are composed of seven strokes or more, learning by a stroke-oriented scheme may be inefficient. But, on the other hand, if the elements of a character are used as the basic units, then the problem can possibly be solved. For example, the character "一" (oneness, whole), "二" (two), and "三" (three), which could be explained in terms of the characters "一" and "二". It could also mean "trinity", which may then be explained in terms of "heaven, earth and human beings". Another example, the character "大" (great person) is composed of "人" (man) and "一" (one), which means a man that has received the "one" (the awakened true nature, "道" TAO, Truth) from heaven thus becoming a great, virtuous man.

2.4.6 Remembering

“Remembering” is often an act of reconstructing an event recorded in the memory. Information is better recalled if presented in an organized framework, which makes systematic search possible during retrieval (Sigelman & Rider, 2003). The task of learning Chinese characters has been compared to a person trying to remember all telephone numbers in the phone book. Each character has to be memorised separately, because it cannot be decoded like an alphabetic word. This can limit the extent of adult literacy. However, there are six ways of constructing Chinese characters (to be explained in 3.4.1) that can help the learner to integrate the characters’ radicals, phonetics and stroke order. Each Chinese character is composed of three elements: shape (morphs), sound (phonetics) and meaning (semantics) and *The Enlightened Chinese Characters* the informational website developed for this research provides a visual approach to learners by showing the structures of the characters as well as the meaning behind it. In doing this visual exercise, the learners consciously or unconsciously create a picture of the basic element: this will result in a much faster retention, without an actual repetitive memorization effort. There are some consistencies in the combinations of characters to be memorised, so that knowing one or more of the combinations in a character can make it possible to work out the word, rather like knowing classical roots and affixes in English words of classical derivation.

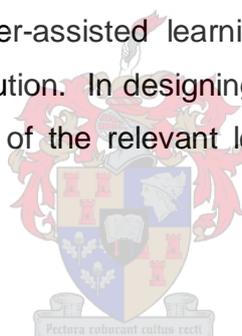
As a student, one of the main concerns is to retain learning while you continue to acquire new knowledge. Do we remember more when we begin to study a subject or after we already know something about it? According to several recent studies, learning which involves memorization of a unit of material begins slowly, then goes faster, and finally levels off (Baddeley, 1990).

2.5 Conclusion

Over the past years, various language learning theories have seen a shift from the highly guided to the more open learning environment with constructivism as a new

and very much learner-centred paradigm for learning. The concept of constructivism was derived from the cognitive psychological theories. In the principle of constructivism, learning is regarded as a self-structured and self-motivated process of knowledge construction and the learner is regarded as a self-governed creator of knowledge.

“whilst significant change was occurring in theories of language, language learning and language teaching, rapid change was also taking place in computing” (Levy, 1997, p. 22) As we live in a modernized society in which the technology has become the trend, we shall realize there is a mutual need in language teachers to use computers. CALL offers tools, learning materials, and pedagogical approaches of immediate concrete value in enhancing language learning programs. Increasing the use of computer-assisted learning systems is a prime goal of virtually every educational institution. In designing a CALL application, one should keep in mind all the elements of the relevant learning theories to enhance the learning process.



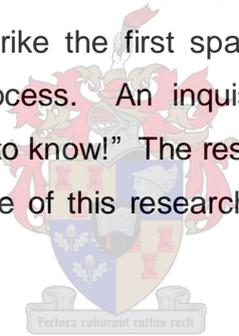
CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter will introduce the methodology that is used in this thesis and the conceptual design work of the web application. In this chapter I will outline the procedures that I have followed in this thesis and the conceptual design work will introduce how the web application, *The Enlightened Chinese Characters*, has been constructed.

3.2 Research Methodology

The world is filled with unanswered questions, unresolved problems. Everywhere we look, we see things that cause us to wonder, to speculate, to ask questions. And by asking questions we strike the first spark igniting a chain reaction that culminates in the research process. An inquisitive mind is the beginning of research; "Inquiring minds want to know!" The research process, by its nature, is a cycle. The following is an outline of this research. The details will be discussed under sub-sections.



1. Firstly I determined what the problems were that I had encountered during my teaching experience and how I would be able to help my students during the learning process.
2. After a few years of observation of the local (South African) students, I noticed that it was hard for them to memorise the Chinese characters.
3. Therefore my goal was to create a web application which could assist students in learning Chinese characters.

4. Obviously memorising is a cognitive process and therefore I began by doing research on the cognitive learning approach together with computer assisted language learning.

5. There are two types of data collected by the researcher for this study: quantitative (refer to Appendix I) and qualitative (refer to Appendix II).

6. The scores on the survey constitute the quantitative data. The qualitative data is comprised of the students' (University of Stellenbosch from year one to year three Mandarin course learners and the researcher's own students) response to open-end questions and informal interviews. (as discussed in 3.3.5)

7. I then conducted an informal interview (appendix II) of the students' response on the web application. Firstly I taught the students how to write the Chinese characters by using a traditional 'pen to paper' technique and then they were exposed to one of the sections named '*182 Illustrated Chinese Characters*' within my web application (*The Enlightened Chinese Character*).

3.3 Conceptual Theoretical Layout

3.3.1 Introduction

With the rapid development of multimedia technology in recent years, a great deal of research has shown that multimedia, if well designed, can model and imitate interactive, complex behaviours in terms of the design of the educational multimedia programs and therefore can be a dynamic and flexible tool to promote language learning in an interactive context. Such findings have presented new challenges to language teachers in rethinking their teaching methodology and in restructuring their language curriculum.

Therefore I firstly discuss the importance of incorporating multimedia into the Chinese language curricula and the definition of a multimedia approach to language teaching in general in this research paper. Subsequently, I demonstrate a series of theories which enhance the foreign language teaching process and relate to the cognitive approach to Chinese characters learning.

3.3.2 Set Goal of the Research Paper

The goal serves as a direction to the researcher for without a goal a researcher does not know how to conduct a research study. The statement answers the question, "What problem do you intend to solve?" .

The goal of this research paper is to facilitate the learning of Chinese characters for Chinese language learners through designing and implementing a computer-assisted learning system on a PC. With the use of graphics and sound, the origins and history of Chinese characters are introduced to the learner. Moreover, the understanding of these concepts is deepened by means of demonstration and practice to help enlarge the learner's vocabulary and knowledge on the Chinese characters, history and culture.

3.3.3 Hypothesis

The following are the proposed hypotheses of this study:

1. Combining the origins of the Chinese characters with the structure and historical background of the characters will create a more efficient understanding of the learners.
2. A cognitive approach plays a significant role in learning and memorising the Chinese characters.

3.3.4 Needs & Analysis

Two survey were done. The first was in the form of a questionnaire. (See appendix I)

1. Which of the following languages do you think will be used the most in the future?
a. Chinese b. Spanish c. German d. French
Why? Would you consider learning it? yes no
2. Do you find it difficult to learn Chinese? Please state reasons for your answer.

The response to these questions gives the researcher an indication on how the students from the University of Stellenbosch view the Chinese language and the significance of the Chinese language. The positive response of the questions (as shown in 3.3.5) actually supports the whole research process and without these responses it would be hard to carry on with the rest of the procedures. Although they are general questions they serve as a background support to this study. The following three questions pinpoint the problems that the students have encountered during the learning process:

3. Have you learnt Chinese before?
 yes no
4. Please indicate the level of difficulty by inserting numbers 1 ~ 3. Number 1 being the least difficult and 3 being the most difficult.
 Chinese pronunciations
 Chinese writing (characters writing)
 Chinese reading
5. Do you think that by knowing the structure of Chinese characters, you will be able to understand the culture better?
 yes no

The last two questions:

6. Would you like to learn the structure and origin of Chinese characters by means of multimedia, such as a website?.

yes no

7. Do you agree that multimedia could play an educational role in helping students with language learning?

yes no

Why?

They show the researcher the level of interest that the learners have towards a web application as a supplementary course, as well as their view toward the role multimedia could play in an educational setting.

The second survey in the form of oral interviews was conducted after the web application was completed and had been tested by the students who are currently learning the Chinese language. Two groups of students were randomly selected to take part in the experiment. They were given a time limit of 1 hour in which they were taught 20 of the same Chinese characters (see Appendix III). However, the first group, the control group, was taught in a traditional pen-to-paper way (with an instructor only teaching them how the strokes are to be written) and the second group, the experimental group, was taught by only using of the web application (with no instructor). After 1 hour both groups were tested by writing the memorised characters on the blackboard. The results showed that the students using the web application were able to recall most of the characters that they had memorised. On the other hand, the students that used the pen-to-paper technique found it difficult to recall the memorised characters.

An informal oral interview (Appendix II) was conducted with both groups. They were interviewed by the researcher and asked about their opinions on the two methods used. The students that used the web application said that they were able to use the images (and the meanings of the characters) given in the web application to connect to the corresponding character, thus making it easier to memorise. The pen-to-paper group said that they got confused with the number of strokes needed to create the characters as they could not relate it to anything.

The details of the test results, as well as observations will be described in the following sections.

To summarize, the website caters for learners of different ability and style. Used in a self-study situation, students can avail themselves of more time for effective character learning. Thus their learning can be individualized to suit their individual learning style, pace and needs. In other words, multimedia has the potential to combine the advantages of self-study with those of classroom teaching to become an excellent self study aid, making learning a more effective and enjoyable process. The evaluation confirmed the need of such technology.

3.3.5 Results of Questionnaire I

In this section, I will select a few important responses from the Questionnaire I (see Appendix I).

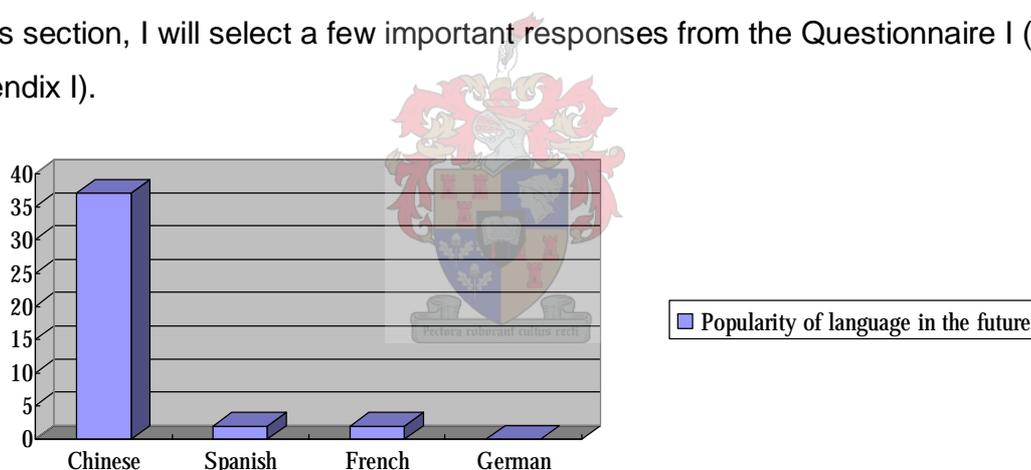


Fig.1 : Results of answers to question 1 of questionnaire I

Figure 1 is a diagram drawn to show the results of question 1 of Questionnaire I. Most of the responses chose Chinese as the most popular language in the future mainly due to commercial reasons and secondly, due to the large Chinese population in the world. In general, the economic point of view is the main aspect that drives the Chinese language learners.

In question 2, the majority of the respondents (75%) said that they do find Chinese difficult to learn mainly due to the complexity of the Chinese characters, not being in the right environment and due to the grammatical structure of the Chinese language.

It is also imperative that the learner is able to understand what the lecturer is saying. For example, one of the responses stated: "I don't always understand the lecturer". Therefore, a mutual understanding between the learners and the instructor is crucial during the learning process.

The other 25% of the learners responded that Chinese was not difficult to learn, as they have a positive attitude towards this task. They believe that if one is dedicated and works hard at it, then one will succeed with not much difficulty.

The learners were asked to indicate out of three options (pronunciation; writing or reading), what the most difficult part of Chinese language learning was. 77% of the learners said that they found the writing to be the most difficult. 11.5% found the pronunciation most difficult and another 11.5% found the reading to be the most difficult. 87% of the students established that by knowing the structure of the characters, one would be able to understand the culture a lot better.

98% of the learners agreed that multimedia could play an educational role in helping students with language learning. The reasons were based on the fact that learners will be able to study even in the absence of the lecturer. Another reason was that multimedia would help with the conceptualisation of ideas, and the visualization of characters due to the usage of both sides of the brain which work simultaneously.

3.3.6 Discussion of the Interview

Most of the world's languages are written alphabetically; in an alphabetic writing system the basic components represent sounds only without any reference to meaning. For example, the letter "b" in English represents a voiced bilabial stop, but no particular meaning can be attached to it in its function as a letter of the alphabet. Chinese writing is logographic (Norman, 1988), that is, every symbol either represents a word or a minimal unit of meaning. When I write the character 羊, it not only has a sound, "young" but also has a meaning, "sheep". Only a small number of symbols are necessary in an alphabetic system, but a logographic system, such as Chinese writing requires thousands of symbols.

Due to the pictographic nature of Chinese written characters, students would complain that learning to write Chinese is about fifty times as hard as learning to write French (Norman 1988). The problem with character writing and memorisation lies in the fact that Chinese characters do not directly reflect their pronunciations. While the word "five" in English directly reflects its pronunciation, following generic spelling rules existing in the English language, the same word in the form of a Chinese character, 五 (five), which consists of three straight and one bent line, does not. In other words, each line or stroke in the Chinese character 五 (five), quite unlike each letter in the English word "five", does not have a phonetic value by itself, and thus the combination of the strokes does not give any clue regarding its pronunciation.

From the aspect of sound, every Chinese character represents one syllable. Many of these syllables are also words, but we should not think that every word in modern Chinese is monosyllabic. The word for "telephone," for example, is 電話 *dian hwa*; since this word has two syllables, it is necessary to write it with two characters. Each of these characters has an independent meaning; *dian* means "electric," and *hwa* means "speech or words"; in this particular case neither of the

characters can be used alone in modern Chinese as a word; however, about three and a half thousand years ago, both characters were independent words. So, when we say that Chinese has a logographic writing system, one in which a basic symbol represents an independent syllable, we are speaking of the Chinese of a much earlier period.

In Mainland China (PRC) some of the most complex or frequently used characters have been simplified by reducing their number of “strokes” or lines, in order to make them easier to learn to read and write. For example, if we look at the character, 國 (country). It has been simplified to 国; and another example of 義 (righteousness), which has been simplified to 义. Furthermore, some of the least frequently used characters have been merged into a single character. The result of the reduction of strokes has been to raise the literacy rate in Mainland China. (Yin & Rohsenow, 1994)

Along with the spread of literacy in Mainland China (PRC), the government has adopted a spelling system, the *Han Yu Pin Yin* phonetic system (Yin & Rohsenow, 1994), which uses the Roman alphabet to reflect the pronunciation of Chinese characters. The alphabet is used to assist in the pronunciation of Chinese; however, when learners who are not already fluent in Chinese attempt to use the system it may cause confusion because of the complicated sound transcriptions. (Chinaknowledge, 2000). According to my own observations and teaching experiences, I have found that in the beginning stages, before the learners are able to understand the concepts of the Chinese pronunciation system, they often respond to the pronunciations according to their preconceived knowledge on the phonetic system. For example, with the Chinese character “寸” in the *Pin Yin* system, the pronunciation is written as (*cun*), 此 is written as (*ci*) and 冊 is written as (*ce*), but the average English person would instead pronounce it similar to (*choon*; *tse*; and *tser*). Through this example one can see that the “Pin Yin” way of

spelling the pronunciation of each character is very different to the way in which an English person would spell it, which will inevitably cause some confusion to the English learners. Each person would have their own spelling to accommodate their pronunciation according to what they hear.

To summarize my observations and discussions with the learners: I have experienced an overwhelmingly positive perception to the multimedia mode of delivery as far as learning Chinese characters is concerned. (as shown in 3.3.4 & 3.3.5) In conclusion, I have quoted some of the comments from the respondents on the strengths of *The Enlightened Chinese Characters*.

Contents:

- I It is great to see the original forms of Chinese characters; the images help a lot to understand the Chinese characters.
- I The history of the characters and rich information on the characters are very interesting.
- I The development of characters are very important. It helps to remember the meaning of the characters.
- I Learning takes place at its own pace and given in context, characters are explained.

Website design:

- I The website is easy to navigate and the colours that are used on the site are soft on the eyes which benefits reading.
- I Nice and soothing background music and it enhances the reading quality.
- I The graphics and colours that are used in the site look balanced and meet the aesthetic point of view.
- I It can be very useful for Chinese supplementary materials.

In short, the students showed great enthusiasm about the web application *The Enlightened Chinese Characters*.

CHAPTER 4: CONCEPTUAL DESIGN OF WEB APPLICATION

4.1 Teaching Features of the Application

The following 7 points are a brief summary of the teaching key points of my website. They are the main guidelines which create the framework of this website which I personally think, will strengthen the Chinese character learning process.

4.1.1 Pronunciation

In Mainland China the government have made great efforts to reduce illiteracy. During the sixties, there were even books that were published that used the *Han Yu Pin Yin* Romanization instead of Chinese characters. Many people proposed to give up the character system totally. Their main argument is that people can communicate orally without using characters. They are right, but through my own experience I have learned that most people are not able to use the *Pin Yin* system correctly. A second and bigger argument against giving up the character writing system is that although daily communication is possible without characters, "it is impossible to write scientific books or even novels or poems without using characters." (Chinaknowledge, 2000)

Through my personal teaching experiences I have come to realise that the *Pin Yin* Romanization system does not really help the learner at the beginning stages due to the unfamiliar pronunciation system. Instead the *Zhu Yin Zi Mu* 注音字母 (Mandarin Phonetic Symbols [MPS]) (Yin & Rohsenow, 1994), promulgated in 1918, seems to be better suited to beginner learners. Each learner has to go through the basic ㄅㄆㄇ (Bo, Po, Mo, Fo) phonetic system, which uses symbols that are based on the Chinese characters which could help the learners to memorize the characters. Learners create their own alphabetic interpretation according to the sounds that they hear. Due to the imperfection of the *Pin Yin*

Romanization phonetic system, I have personally adapted a new system² according to the needs of the local students (in South Africa). The purpose of the change is to assist the English-speaking people, who have not learnt the *Pin Yin* Romanization system, to learn the pronunciations of Chinese characters. The pronunciations of the Chinese characters are provided in the website and it appears in the form of *Italics* to indicate that it is a foreign pronunciation to the non-Chinese speakers. For example, 書本 (*shu bin*) which means “books”.

The reason I chose *italicized* text is because it attracts the eye due to its' contrast in shape from the ordinary body text. According to Krug (2001), one should use *italics* for convention purposes – when listing book or periodical titles, for example – or within text for stressed or foreign words or phrases. Krug also suggests that one should *avoid setting large blocks of text in italics because the readability of italicized text will decrease, particularly if the screen resolution is much lower.*

Due to the fact that Chinese is an ideographic writing system, every Chinese character can be regarded as a trinity of pictographs, ideographs and phonetics. This unique feature makes Chinese very beautiful. It is indeed a great pity that the beauty of the Chinese characters could not be expressed fully by the Romanized alphabetic system which is composed of alphabetic letters which have no symbolic meaning in the Chinese language.

² The researcher chose the spelling of the pronunciations which are closer to the real Chinese pronunciations in the Pin Yin Romanization system, because some of them tend to be confusing to the local students. Through the researchers' teaching experience it was discovered that each learner would have their own way of spelling the pronunciations, e.g. an Afrikaans speaking person would spell the pronunciation differently to an English speaking person. Therefore the researcher employed the Mandarin Phonetic Symbols (MPS) phonetic system as the main guide and allowed learners to create their own alphabetic interpretation according to the sounds that they hear. In the researchers' web application, the Chinese pronunciation is a supporting tool to the characters and is therefore not spelled according to the Pin Yin system.

4.1.2 Pictographs

Chinese is imaginable because “Chinese emphasizes intuition and images; whereas English is functional because of the Indo-European emphasis on reason and logic.” (Chen, 1999) *The Enlightened Chinese Characters* has provided more than 200 original forms/drawings of the Chinese characters. The characters were chosen according to the frequency of usage in daily life, and they were extracted from the book “*The composition of common Chinese Characters*” (Xie, 1997). Its purpose is to assist the learners in memorising the characters by looking at the picture-like words.

Images are frequently employed in Chinese as metaphors for abstract ideas or to express sentiments and ambitions. For example, 蠶食 (to nibble) likens gradual aggression and describes the way in which silkworms eat mulberry leaves – slowly taking small bites from the leaves. 手忙腳亂 (hand are busy & feet are in rush) vividly describes a person doing something in a rush. The compound depicts a general flurry of activity without specific reference to 手 (hand) and 腳 (foot).

The modern Chinese characters have just less than 1600 different syllables (including the four tone pitches) (Yin & Rohsenow, 1994). There are many characters, even two syllable words, which sound completely the same. The picture-like characters help to explain the modern form of Chinese characters and the meaning is quickly understood. “The latest trends in Mainland China show that one behaves even more up-to-date if one uses the traditional characters instead of simplified characters.” (Chinaknowledge, 2000) In other words, a person who is familiar with the traditional character system will be able to read and understand more than a person who only knows the simplified character system. For example, a person reading the ancient books of Confucius will need the traditional character background to be able to read and understand the teachings. Even if this book

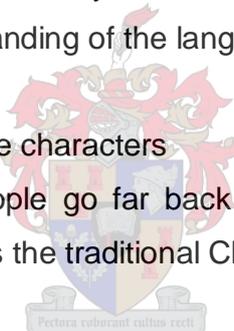
had been translated into simplified Chinese, some of the meaning will not be as accurate.

4.1.3 Story of the characters

An account of the historical evolution of each character is provided in the website to assist retention and expose learners to culture contained in the language. Most of the stories are derived from *Shuo Wen Jie Zi* 說文解字, (the etymology of Chinese characters) written by *Xu Shen* 許慎 in about 100 AD. As the evolution of the character is explained, its formation is also analyzed by showing the radical and phonetic components, in an effort to familiarize students with the composition of the characters. At the same time, the student is learning the culture and the traditional values of the Chinese society. The explanations of the characters help to improve the learner's understanding of the language.

4.1.4 Historical background of the characters

The origins of the Chinese people go far back in time, and Chinese culture is extensive and rich in nature. It is the traditional Chinese high regard for history that has made this possible.



History elucidates the way in which the nations of each age rise and fall, and the way the virtuous ancients built the characteristics required to rule the country peacefully. There are so many great historical stories that have been inherited up until now and people should never under-estimate the value of history. Therefore I have chosen the stories which provide a clear historical background of the Chinese characters so that by reading the historical stories the learners can enhance their knowledge of the Chinese cultures as well.

4.1.5 Structures of the characters

The main focus of this section is on the composition of Chinese characters. There is a traditional theory known as *Liu Shu* (six writings) which are the six types of

writing in terms of pictographs, indicatives, associatives, picto-phonetic compounds, trans-associatives and borrowings. These six categories are *Liu Shu's* induction and summary of the ancient ways of creating characters. They were not all developed at the same time. Strictly speaking only the first four (pictographs, indicatives, associatives and picto-phonetic compounds,) refer to the ways in which Chinese characters are composed; the last two (trans-associatives and borrowings) are concerned more with the ways in which to use them.

Pictographs:

The pictographic method of character construction is based upon the depiction of an object's shape (drawing a picture of it). To express the concept of "sun", 日, one draws a sun; to express the "moon", 月, one draws a moon, and so on. This was the earliest method of character construction, which is obviously the accumulation of the evolution of pictorial recordings and pictograms.

Pictographic characters are simple in form, far simpler than the pictures of pictograms. Pictographic characters have a great advantage over the other types of characters by having a direct visual appeal: it is often easier to remember what kind of object a character represents just by looking at it

Pictographic characters have the merit of conveying meaning directly, but this method of character construction has severe limitations. Among the millions of objects in the world, there are many which cannot be depicted according to any shape, and there is no way to depict abstract concepts directly. For these reasons, the pictographic method was only employed during the early stages of character evolution, and was later gradually phased out of use. Nonetheless, pictographic characters remain the foundation of the whole creation of Chinese characters; they are all simple single-element characters which cannot be analyzed into smaller meaningful

components (Xie, 1997). It is thus very simple to say that they are like the building blocks in creating new characters.

Indicatives:

The indicative method of character construction uses symbols to indicate abstract meanings. There are two subtypes of indicatives: one is composed of a pictograph and an indication-sign, e.g. 刃 (knife-edge), 本 (tree-root); the other is composed purely of abstract signs, e.g. 上 (on top of), 下 (underneath), 一 (one), 二 (two), and 三 (three). “Indicatives account for the smallest percentage of Chinese characters” (Xie, 1997, p. 6). The reason is that for most characters there are simpler ways of composition: characters referring to material objects may be composed pictographically and those expressing abstract concepts may be composed ideographically or by way of picto-phonetic compounds.

Associatives:

Associatives are compounds, composed of two or more than two existing characters. “In terms of structure, an associative is the composition of two or more characters side by side or one on top of another. In terms of meanings, an associative is also the composition of the meanings of its component characters” (Xie, 1997, p. 6). For example, a single character 木 stands for a tree, two trees together 林 refers to a group of trees (forest), and the character made up of three trees 森 means a place full of trees, a thick forest. In another example the character 休 consists of 人 (man) and 木 (tree), signifying that a man is taking a rest against a tree.

The associative method of creating characters is a great step forward from the pictographic and indicative methods. While both pictographic and indicative characters are single-element characters, associative characters

are compound characters. The associative method combines a few simple symbols with definite meanings to create characters with new meaning. This method is clearly much more flexible and adaptive.

Picot-phonetics

The picot-phonetic method of creating characters uses the combination of a phonetic component and a semantic radical to construct a character. The phonetic indicates the pronunciation of the character, and the so-called “radical” indicates the meaning. The combination of the two parts together thus provides both the pronunciation and meaning of the character. In the character 蝗 (locust), for example, the phonetic 皇 (*huang*) tells us that the character is pronounced “*huang*”; the radical 虫 (insect) tells us that 蝗 is a type of insect. The radical and phonetic together give us an insect whose name is pronounced “*huang*”—a locust.

“The picot-phonetic method of creating characters breaks through the restrictions binding the purely meaning-dependent pictographic, indicative and associative methods“ (Yin & Rohsenow, 1994, p. 21). This method was historically a great step forward in the development of Chinese characters.

Trans-associatives & Borrowings

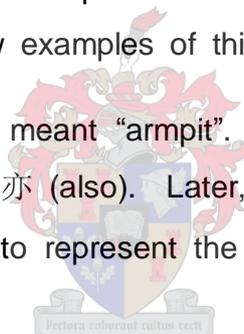
Trans-associatives is a most dubious concept in the theory of *Liu Shu*. *Xu Shen* unfortunately did not give a clear definition for trans-associative characters in his work “*Shuo Wen Jie Zi*” “說文解字”. According to *Xu Shen*, trans-associatives are those which share the same radical, mean the same

³ *An Analysis and Explanation of Characters* was compiled by Xu Shen in the Eastern Han Dynasty, and was completed after twenty-two years of work in 121 AD. It was the first Chinese character dictionary and the first work of characterology in Chinese history, and is still in wide use today. The *Shuo Wen Jie Zi* classifies and explains 9353 characters from pre-Han Dynasty times, as well as giving 1163 variant character forms. The head characters for each entry are written in the small seal characters style. All of the characters in this work are arranged under 540 semantic radicals. This is in fact the first dictionary to adopt the semantic radical indexing system.

and are mutually explainable. For example, the character 老 (*lao*) has the same meaning as 考 (*kao*) both meaning “old”. Strictly speaking, “trans-associatives is not a way of composing new characters, but a way of using existing ones.” (Xie, 1997, p. 7)

Borrowing is also a way of using existing characters. It works as follows: if two words have the same pronunciation, then a character representing one word may be “borrowed” and used to represent the other as well. The meaning of the character here is irrelevant; it is only borrowed for its sound. The character-borrowing method was an early development in the history of Chinese characters. Usually, a character expressing a fairly concrete meaning would be used to represent a homophonous word with a more abstract meaning. A few examples of this method are: 亦, an indicative

character, 𠂔, originally meant “armpit”. It was borrowed to signify the homophonous adverb 亦 (also). Later, the picto-phonetic character 腋 “armpit” was created to represent the original meaning of 亦. (Yin & Rohsenow, 1994, p. 26)



The traditional view that *Liu Shu* is a summary of the different ways of composing characters, therefore, is not very accurate. Nevertheless the theory *Liu Shu* is basically correct in revealing the general pattern in the creation and development of Chinese characters. It may help learners to better understand the composition of Chinese characters and their original meanings. And thus use them more accurately. The visual approach and interaction of the website helps learners to grasp the basic writings and see how they have evolved into the traditional form of Chinese characters.

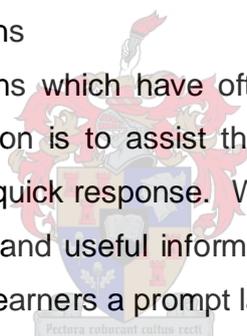
4.1.6 Culture vs. language

The creation and evolution of Chinese characters is closely interwoven with the development of Chinese culture. Chinese characters are the basic carriers of the traditional Chinese culture, and, as an important tool for extending, spreading and exchanging ideas, they have played a critical role in the long history of the Chinese nation. One may well argue that without Chinese characters, Chinese culture would not have achieved the splendours it has.

Therefore a lot of scholars would say that to explain the Chinese characters would be like telling the story of Chinese history and culture. The origins of Chinese go far back in time, and culture is extensive and rich in nature.

4.1.7 Frequently Asked Questions

I have collected a few questions which have often been raised by the Chinese language learners. The intention is to assist the learners in searching for their answers and in turn, receive a quick response. Within the session of FAQ, I have also included a variety of valid and useful informational and educational web site links which can assist in giving learners a prompt launch to the Chinese language.



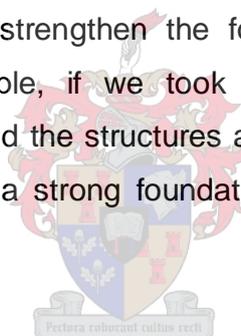
4.2 Purpose of the Web Application ~ *The Enlightened Chinese Characters*

Although the website is about Chinese characters, it also has a deeper insight to be discovered. Instead of just learning how to write the characters and how to pronounce the words using the technical rules, there is more emphasis on the origins of the characters and the history behind it.

The purpose of this web application is to introduce learners in a lively and accessible way to the origins, evolution, historical background and composition of Chinese characters, their shapes, meanings and correct formations, as well as their ancient illustrated forms via multimedia application. The web application will serve as a key to the fascinating realm of Chinese characters.

By introducing the above information, I hope that the Chinese language learners will benefit and gain a deeper understanding during the learning process and at the same time, demonstrate how learning could take place with the assistance of a computer program.

A lot of learners try to learn the technical side of the Chinese language by memorizing the shapes and sounds. This may help the learners to pick up the language in a short period of time but their foundation will not be strong enough. They can still build this basic level of Chinese on an unstable foundation, but when they want to extend their house or build a second floor, their foundation will not be able to hold. They will have to rebuild their foundation in order to advance. This is how my website will help to strengthen the foundation of those learning the Chinese language. For example, if we took the origins as the gravel, the transformations as the sand, and the structures as the water, and we mixed them all together, this would create a strong foundation for the building of this great house.



4.3 Principles of Informational Websites

The aim of this website is to present valuable knowledge on the origins of Chinese Characters to the lecturers and learners, therefore, a lot of information has been provided. The website has thus been constructed under the principles of an informational website as stated below.

Required characteristics of an informational website:

1. The text is text that you have written, not text you have downloaded or otherwise copied from someone else.
2. The text and other contents are informative, not just entertaining.
3. All elements of your site are suited to your audience and purpose.

4. The text is accurate, informative, and well written.
5. The pages are to be easy to read and use when accessed on a computer screen.
6. The pages and text follow the principles of good design.
7. The pages are easy to navigate individually and as a group.
8. The site is well organized with both hierarchical and associative links.
9. The pages are unified with one another in terms of visual design, writing style, and purpose.
10. The images are not copyrighted and use of them is not otherwise restricted. (You may obtain images by downloading them from the web).
11. The loading times are reasonable. (Avoid movies, large images, and other items that take a long time to download). (VCU English, 1999).

In summation, the website should maintain an easy to follow navigational system throughout the site. A website created by Flash may look very appealing, but it is highly unlikely that learners are going to wait for it to load. In order to minimize download time, web designers should avoid using too much graphics or images that are large in size. Visitors will not be able to read comfortably with all the effects going on in the background and it may cause irritation.

4.4 Web Design Layout

Web sites, especially educational websites, should be designed to give learners a sense of interaction and choice. This could be achieved by a user friendly navigational system and a graphic interface that is not too complicated. This could make it easier for the learner to jump from one section to another without getting lost and confused. The goal is to provide for the needs of the potential users, adapting web technology to their expectations and never presenting readers with an interface that places unnecessary obstacles in their paths. (Krug, 2001)

I Navigation system

For a large site, navigation issues need to be design driven. It is important to get readers to the information that they want as quickly as possible. One common rule of thumb is the “three click rule” (Porter, 2003) which says that a reader should be able to get from any page to any other page with a maximum of three hypertext links.

It is also important to remember that readers will look for different kinds of paths and navigational support, due to either situational aspects or personal preferences and working habits. Providing redundancy in navigation is one way to deal with this, so that many paths can lead from one particular page to another. By using techniques such as cross-linking of index pages and having a site map, it should be possible to maintain a three-click radius for a site containing hundreds of pages. (Boyle, 1997) However, at some point, it becomes necessary to split sites into sub-sites, and to focus on navigation within those regions.

The Enlightened Chinese Characters provides the learners with an easy navigation system and user friendly interface. The main navigation system is at the top of the web page and sits below the banner. (Fig. 1)



Fig. 1 Illustration of main navigation bar

The sub-navigation bar (fig. 2) which is the sub-section of each chapter can be found at the top of each page under the main heading. This makes it

easier for the learners to locate the headings that they are looking for. The arrangement of the navigation system remains consistent on each web page which familiarizes the learners with the layout of the site. The sub-headings of each chapter will be highlighted on the main banner of each page above the navigation buttons. This will show the user which sub-section they are busy studying.



Fig. 2 Illustration of sub-navigation bar

The sub-navigation headings (Intro; Origins & History; Methods of... in fig. 2) serve as the main titles of the sub-headings (Origins; Transformation; Structures...) whereas the main heading (Simplified Chinese) is indicated on the main banner preventing confusion to the users. In addition, there is a box above the main text indicating the history of the navigation to the user (fig. 3) (Home>> Simplified Chinese>> Introduction), also called bread crumb navigation.

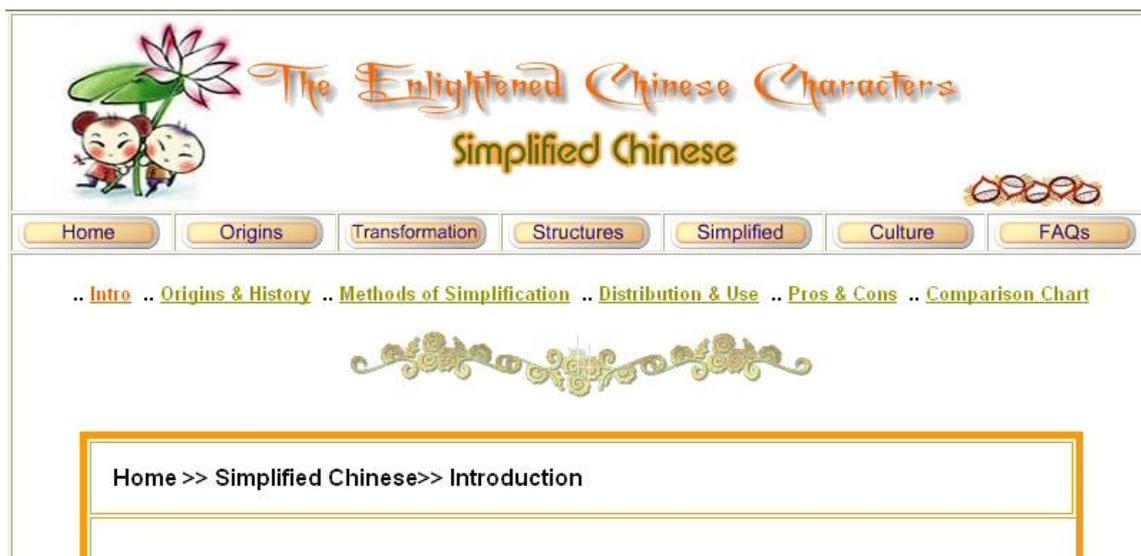


Fig. 3 Illustration of bread crumb navigation

I Consistency of the website layout

The design layout of *The Enlightened Chinese Characters* follows a consistent method to handle the large quantities of text and graphics. The consistent layout creates rhythm and unity across the pages of the site. A unswerving approach to the layout and navigation allows readers to adapt quickly to the design and to confidently predict the location of information and navigation controls across the pages of the site (Boyle, 1997). Personally I think that repetition is not boring, instead, it gives the site a consistent graphic identity that creates and then reinforces a distinct sense of “place” and makes the site more memorable.

I Graphics

Many web users currently access their Internet service providers via 56 kilobits per second (KB/s or Kbps) modems from their homes, offices, or remote work sites. At 56 Kbps the actual download rate is only about 7 kilobytes (KB) per second (8 bits make a byte). This means that a modest 36 KB graphic on your web page could take five seconds or longer to load

into the reader's web browser. Thus, the actual data transmission rates will vary depending on the user's modem, web server speed, Internet connection, and other factors, but the overall point is clear: the more graphics you incorporate, the longer the reader will have to wait to see your page. At an average modem speed of 56 kb per second most pages designed for users dialling in from home should contain no more than 50 to 75 kilobytes of graphics (Boyle, 1997). *The Enlightened Chinese Characters* site has tried to keep to this requirement in order to prevent the large graphic file from slowing down the transfer speed.

Due to the fact that the site is an informational website, it is important to create an optimal balance between text reading, visual sensation and graphic information. Without the visual impact of shape, colour, and contrast within the whole site, pages would be graphically uninteresting and will not motivate the viewer/ learner. Dense text documents without contrast and visual relief are also harder to read, particularly on the relatively low-resolution screens of personal computers.

Imagine a serious look about the web site, plus a heavy load of content, this will not create a relaxed feeling and good impression towards the learner. Therefore I decided to soften it up a little by bringing in a touch of Chinese culture in the form of graphics. The graphics should not only achieve visual functionality but also the delivery of a message. E.g. 喜鹊 (magpies) (Fig. 4), which appear on the home page of the site, are favoured birds in Chinese culture. Chinese people believe that when they see the magpies, they will always be lucky. Thus the magpies appear right on the main page to wish the learner success in the learning process. From the home page onwards, there are different graphics of Chinese children playing various traditional activities on the banner (skipping, the riding of an ox and playing with fire-works during Chinese New Year). The aim of these graphical pictures is to

create a fun and energetic atmosphere within the website instead of just plain text.



Fig. 4 Illustration of the elements of the banner: graphic and text

I Text font

Fonts are divided into two broad families: serif and sanserif (Boyle, 1997). An example of a serif font is 'Times New Roman'. Serifs are the small decorations added to the ends of the letters; and a sanserif font consists of letters without decorations like 'Arial'. A serif font on a screen can look crowded because of poor resolution on the screen and makes the letters seem like they flow into each other. Hence a sanserif font is often used on screen. Therefore, the font, Arial, was chosen to be used in *The Enlightened Chinese Characters* to enhance the reading quality.

I Music

Music plays an important role in helping a person to relax; it helps a person to restore, maintain and improve their emotional, physical, mental, and spiritual health as well as creating a sense of well-being. Due to these different benefits, the web site also employs a piece of relaxing Chinese music which could enhance the overall reading quality. It also brings an oriental feeling to the learning process. Learners have the option whether to play or stop the music according to their preference.

I Banner

The idea behind the title, *The Enlightened Chinese Characters* was conceived from the background of a long and rich Chinese history. Chinese characters have one of the oldest histories of any writing system on earth. The characters are a kind of living fossil among the writing systems of the world. Over the years, however, the characters have lost some of their original meaning. For example, 我 (wo) is a pronoun presently used to refer to the first person (I), however, the same word in ancient times was employed to refer to a type of weapon that was used to execute criminals or dismember animals (Xie, 1997). Therefore, this study aims to enlighten readers as to the original meaning and bring historical truths to present day Chinese characters. The website also aims to enlighten the learners' knowledge of contemporary Chinese characters.

If we only count from the time of the fully developed *Shang* 商 Dynasty oracle bone inscriptions, we can say that they have a history stretching back more than 3,000 years. From those ancient Chinese characters up to the modern Chinese characters, although there have been many changes in their forms, from the point of view of the writing system as a whole, there has been no basic qualitative change. The fact that one writing system has been able to stand the test of time for thousands of years is most definitely a unique wonder among the history of the world's writing systems.

The aesthetic effect on the actual words "*The Enlightened Chinese Characters*" (Fig. 4) creates a mystical feeling which bravely expresses the long and mystical Chinese history and the mystery behind the characters.

I Colour

One of the main aims of a multimedia designer is to construct effective and creative presentations through the use of colour. The colour choice of foreground objects may be affected by a number of considerations:

1. Realistic portrayal of objects
2. Aesthetic effect
3. To convey colour coded information
4. To conform to standards (Boyle, 1997, p. 162)

Colours may be used to aid the perception of relevant information. Colour schemes may also be chosen to conform to standards such as the default colour scheme for the Windows environment as well as in achieving a pleasant aesthetic effect (Boyle, 1997).

“Whatever colour is chosen, the background colour should be soft on the eye and non-intrusive” (Boyle, 1997, p. 162). White has been chosen for the background colour of *The Enlightened Chinese Characters* because “it leaves maximum freedom for the selection of colours for foreground objects” (Boyle, 1997, p. 161). In fact, the choice of colour in *The Enlightened Chinese Characters* depends on the nature of the website as well as my personal preferences. “Avoid using too many colours and avoid abrupt changes in hue in adjacent highly saturated colours” (Boyle, 1997, p. 163). “Limit your colour choices to 2 or 3 and use them in a consistent manner across the entire site. Using too many colours makes a page appear cluttered and distracts the eye” (Walden, 2005). I therefore blended the tones of the main colours of the graphics (red, green and blue) and by doing so, I tried to create a harmonious colour scheme. However, every user may have different preferences in choosing a colour scheme that suites their needs. The pastel colours that were chosen on the site were not only

selected to relieve strain on the eyes of the learners but also to achieve an aesthetic effect.

From a cultural point of view, red, green and blue are usually the favourite theme colours of the Chinese traditions. Red has always been used in joyful occasions to symbolize good luck and prosperity. Green and blue are often used to make garments for the government officials of ancient China, which indicated their rank. So both colours green and red, refer to the symbol of fame and position. However, the colours used for the emblems of the emperors are always gold or red. My intension of employing the three bright colours is to create a comfortable atmosphere during the learning process in the hope of helping the learners to succeed in mastering the Chinese characters.

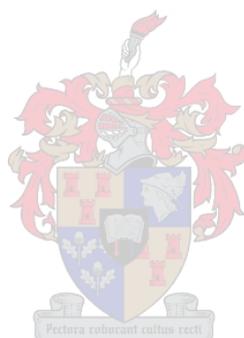
4.5 Conclusion

With the advancement in educational technology and the increasing demand from the industry for highly proficient Chinese language speakers, there is a need to find a more flexible, effective and efficient mode of delivery for learning and teaching Chinese, especially Chinese characters. It has become obvious that the traditional way of teaching and learning Chinese characters is facing a serious challenge from the multimedia mode of delivery. For example, if more focus could be placed on basic computer training within education then this obstacle could be overcome.

Through the feedback from the learners, I have come to realise that the multimedia mode of delivery is well accepted and liked by the students. Students liked the fact that they have overall control over their learning process. As I can recall about 15 years ago in Taiwan, when the multimedia mode of teaching was first introduced into the classroom, the students were very eager and enthusiastic on exploring more about the programs. This added a new dimension to the classroom activities, and accelerated the students' motivation and self esteem by enabling them a little

more control over their learning process. Students for the first time, could slow down, or increase the pace of their learning according to their level of understanding. In overall, this study confirms the students' enthusiastic endorsement of the multimedia mode of delivery.

As computers become more and more sophisticated, language educators will be facing challenges in learning various programs used to design the academic programs which will assist the learners. The on-screen-presentation will play an important role in attracting the interest and motivation of the learners. Therefore the emphasize on creating an aesthetic, interactive program which can fulfil the purpose of an educational website is very important.



CHAPTER 5: CONCLUSION & RECOMMENDATIONS FOR FUTURE RESEARCH

5.1 Conclusion

In conclusion, the significance of this research is two-fold. First of all, since there is a lack of research done on the application of this mode of delivery in Chinese language teaching, the findings of this research thus have, to a certain extent, bridged the gap between the theories of CALL and their applications to Chinese language teaching.

Secondly, the success or failure of CALL programs depends on the judicious exploitation of technology, informed by the knowledge of language structure and language pedagogy. It will be unfortunate if language instructors do not take full advantage of the new technology to assist in the teaching of language. In order to prevent this from happening, the use of technology has to be guided through the principles of pedagogy.

The Enlightened Chinese Characters bridges a gap in the teaching of Chinese characters with multimedia in that it offers a range of features that other existing packages do not possess, such as rich information on the origins and historical background of the Chinese characters, characters used in context, easy information retrieval, user friendly interface, etc. These research findings indicate that multimedia is a powerful instructional medium worthy of further exploration. Its full benefits are yet to be realized as far as its application to learning Chinese is concerned. This research presents a modest start, but demonstrates that studies of a larger scale on the benefits or drawbacks of the multimedia mode of delivery in teaching Chinese language are now needed.

Last but not least, CALL programs can have personalities as well. Some are charismatic and inspiring; some are quiet but helpful; some are pedantic and overbearing. Some are more fun than others. However, tastes do differ. What is charismatic to one user, may be overbearing to another; what is cute to one may be too cute to another. Though very hard to please everybody, the personality of a program should nonetheless be considered, if only to avoid jarring audience's sensibilities.

5.2 Recommendation for Future Research

The teaching of Chinese characters is a challenge and instructors should try different approaches to discover the one which suits the needs of students. Whether the endeavour is successful, has to be assessed by the learners themselves.

There is still a great deal of further research to be conducted in the areas of neuroscience that are related to Chinese character learning. (Yu, 2005). I personally think Chinese CALL could play a positive role in teaching and helping students to learn the Chinese characters. However, it should not completely take the place of the teachers, instructors or facilitators just "because a computer *can* complete a task does not mean that it *should*" (Levy, 1997, p. 207). The goal of the majority of language learners is to be able to interact with people face to face in daily life and use language to accomplish the 'real world' tasks, instead of merely facing the computer and learning from it. Through my own experience as a language teacher, I think that the interaction between students and teachers (instructors or facilitators) still plays an important part in the learning process.

As far as I'm concerned, there is still room for 'The *Enlightened Chinese Characters*' web application to be developed further. The web application is based on the principles of the English language which will benefit the English speaking learners. However in addition to what I have done, it would be a great advantage

to learners if a feature existed that enabled the learner to toggle between an English based program and a Chinese based program, it would thus be beneficial towards a larger audience. A professionally illustrated Chinese character online dictionary could also be developed, which could emphasize on the original forms and historical background of the Chinese characters and the way in which the characters have been created. However, this would require a large database for the application and would call for immense teamwork from the educators.

In addition, schools should take measures to encourage educators to learn more about modern technology, and support them with the necessary technical services. Companies and schools should cooperate more closely to put the current resources to good use. As for teachers, we should realize that we have the responsibility to study and use all the effective methods and media necessary, especially modern technology, to improve our teaching on a daily basis.

Finally, learning is a life long process and those who have a determined heart and a positive attitude will succeed and master the Chinese language.



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Appendix I

Questionnaire for 2005 MPhil Master's Final Project

This questionnaire is a survey to assist in understanding the target market for the MPhil Master's 'Hypermedia for Language Learning' course. Your response will be greatly appreciated.

1. Which of the following languages do you think will be used the most in the future?

- a. Chinese b. Spanish c. German d. French

Why?

.....

.....

Would you consider learning it? yes no



2. Do you find it difficult to learn Chinese? Please state reasons for your answer.

.....

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.....

3. Have you learnt Chinese before?

- yes no

4. Please indicate the level of difficulty by inserting numbers 1 ~ 3. Number 1 being the least difficult and 3 being the most difficult.

- Chinese pronunciations
- Chinese writing (characters writing)
- Chinese reading

5. Do you think that by knowing the structure of Chinese characters, you will be able to understand the culture better?

yes no

6. Would you like to learn the structure and origin of Chinese characters by means of multimedia, such as a website?.

yes no

7. Do you agree that multimedia could play an educational role in helping students with language learning?

yes no

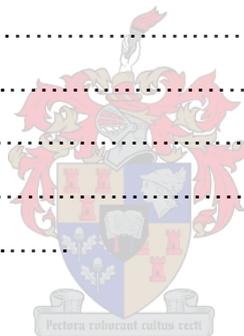
Why?

.....

.....

.....

.....



Appendix II

Questions of Oral Interview

1. Do you like the design layout of the *The Enlightened Chinese Characters*? Does it achieve an aesthetic effect and does the whole site look balanced?
2. Do you prefer to learn characters in a traditional way, reading books or on a multimedia supplementary program?
3. Do you feel that you benefit or learn a lot from the site?
4. How do you memorise Chinese characters?
5. When you see the *Han Yu Pin Yin* Romanization phonetic system, do you firstly refer to the spelling pronunciations in your language phonetic system or in the *Han Yu Pin Yin* system?
6. Do you find that the illustrated Chinese characters help a lot in learning the Chinese characters?
7. Do you realise by learning Chinese characters you also enhance your knowledge on the Chinese culture?
8. Do you think that it is necessary to know the origins of the Chinese characters?
9. Do you think images and graphics are necessary to have on this website?
10. Does this web site meet an educational purpose?

Appendix III: TEST WORDS

- | | | | |
|-----|---|-----|---|
| 1. | 信 | 11. | 草 |
| 2. | 疆 | 12. | 花 |
| 3. | 淼 | 13. | 門 |
| 4. | 焱 | 14. | 開 |
| 5. | 想 | 15. | 材 |
| 6. | 象 | 16. | 視 |
| 7. | 明 | 17. | 解 |
| 8. | 鮮 | 18. | 情 |
| 9. | 道 | 19. | 家 |
| 10. | 本 | 20. | 剪 |



Appendix IV: Site Map of *The Enlightened Chinese Characters*

