

Learning Chinese Characters through Multimedia

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Introduction

While much second language teaching and learning has benefited from the employment of multimedia, its application is still relatively new to the teaching and learning of Chinese as a second language, not to mention any comprehensive research in this area. In other words, there still exists an empirical gap between theories of CALL (Computer Assisted/Aided Language Learning) and its application in the area of Chinese language teaching. This paper is intended to bridge this gap. It is set against a background of research into the needs and problems of students studying Chinese, to be more precise, it addresses the problems that students of Chinese language face in learning Chinese characters.

To solve these problems, I developed Chinchar (short for Chinese Characters), a CALL package for teaching Chinese characters. Before the development, an evaluation was performed by Farguhar, Wang, and Trevaskes (1996),¹ to elicit students' perceptions of both traditional and multimedia methods of teaching and learning Chinese characters; a Needs Assessment was also carried out to determine whether there was a need for such a CALL package. I then trialed Chinchar with students at Griffith University in 1997 and designed and administered two sets of survey questionnaires. The first questionnaire (later referred to as Survey 1, as opposed to Survey 2) was administered before trialing Chinchar, focusing on the difficulties in learning Chinese characters perceived by the students. The one after the trial of Chinchar (Survey 2) elicited students' perceptions of the role of multimedia in learning Chinese characters and its effectiveness. Due to the limited scope of this paper, only some of the Survey 2 results will be discussed in detail. The “fit” between computers and character learning will not be discussed here as it has been dealt with by Chappell.² Instead, the paper will explore the design and features of Chinchar and some of the results of survey 2 to shed light on the following question: In what way has Chinchar helped to solve the problems of learning Chinese characters?

Chinese characters and their importance

To learn Chinese language is, to a large extent, to learn the characters, the written script composed of characters, which, with their distinctive functions and features, cannot be replaced by Pinyin, the Romanized phonetic system. This is because Chinese characters have a history as long as the Chinese civilization, and have become an indispensable part of the Chinese culture; they have been pivotal in “promoting a shared cultural and national identity among the world's largest population...” (Kee and Huck, 1991: 50). It is also because Chinese language contains too many homonyms and the difference between them can not be captured by the use of a phonetic system. For a student of Chinese language, learning to read and write the characters is as important as being able to speak. This is especially true when students have reached higher levels of competency.

Chinese characters are built from strokes, which can be horizontal or vertical lines, dots, or various hooks. Although most Chinese characters are pictographic, they cannot be drawn as one pleases. Acquiring an awareness of correct stroke order is a necessary skill for mastering complicated characters in a self-study situation, and for accessing Chinese dictionaries and Chinese word processors, which are partly based on stroke order. As most students of Chinese language have no prior experience with character writing, the correct stroke order also assists students to commit characters to memory.

Identification of the problems

The point of departure for Chinchar started with identifying students' needs, a “bottom-up approach” as opposed to the “top-down approaches centered perhaps upon a theory of language or language learning, or a curriculum specification” (Levy 1997: 2). Students identified the following problems.

Problem 1: An enormous task to accomplish

The belief that it is the characters that constitute the difficulty, not the language as a whole, is shared by both scholars like Wu (1995: 240) and students. 79 % of respondents in Survey 1 agreed that this was the case.

Firstly, this difficulty is attributed to the fact that students have to master a great number of characters, at least 2000 for basic literacy, as well as the tonal and phonetic system of the language (Pinyin) at the same time.

Secondly, each character has an irregular number of strokes. Most respondents in Survey 1 complained that it is difficult to remember the many lines, dots, and hooks in each character.

Problem 2: Lack of Sufficient In-class Time

At Griffith University, first-year students of Chinese language have 5 contact hours per week and 70 per semester, while the second and third-year students have 7 hours per week and 98 per semester, totaling 532 contact hours for a three-year degree. Within the 532 contact hours, the students have to tackle the four-macro skills - listening, speaking, reading, and writing — as well as learning Pinyin. I can only manage to allocate 10 -20 minutes in each weekly writing class for first-year students to copy with me the stroke order of some of the difficult characters. No such time can be spared to the second and third-year students. In other words, because of time constraints and the enormity of the task of learning the four-macro skills, the task of learning characters is of necessity largely left to the students.

According to scales used by the Australian Department of Foreign Affairs and Trade's Guide to Learning Rates, it takes an average of 2000 contact hours and equal self-study hours to become fluent in Chinese whereas it only takes an average of 500 contact hours in such languages as Dutch, Spanish, French, Italian, German and Portuguese. Can we increase the contact hours? Financial constraints in the education sector make this very unlikely and, indeed, we may witness a further cut in contact hours.

Problem 3: Lack of Outside-class Support

Even if the contact hours could be increased, a great amount of time has to be invested outside class during which learners constantly reinforce the characters they have learned in class. This is because learning Chinese characters is fundamentally a task of memory. Ideally, academic support is needed during self-study to ensure its effectiveness by providing instant feedback regarding students' progress. However, to supervise students personally in learning each character outside the classroom is too costly in staff time. Nevertheless, this is exactly the kind of support they most need, as shown in Survey 1. It has become an urgent task for teachers of Chinese language to find students a "teacher" with whom they can learn characters whenever they want to and as often as they need to, outside of contact hours.

The above discussed three major problems, namely, the difficulty in memorizing so many characters, lack of in-class time, and outside-class support, prompted me to the development of Chinchar. These problems also formed the focus of the evaluation of Chinchar. The following describes how these problems were dealt with in the design of Chinchar and in the subsequent evaluation.

Chinchar

Chinchar was developed in 1996 as part of a project funded by a University FLDU (Flexible Learning Development Unit) Project Grant.³ The authoring package used was Macromedia Director 5. The most outstanding merit of this authoring package lies in its capability to create, on one system, a compatible application with both Windows-based (95, NT, and 3.1) and Macintosh computers (OS, OS/2, 3DO, OS/9).

The package contains 478 characters of high frequency and various complexities, and 1434 sentences as examples to demonstrate the usage of these characters.

Nearly 50% of the characters in Chinchar are contained in Introductory Chinese, a textbook used by the first year and second-year students at Griffith University and other universities in Australia. Although about 20 of the 478 characters are not elementary in terms of character structure and usage, they may be used for comprehending the construction of more complicated characters. These characters are inclusive of all the character stroke orders needed for writing a character.

Interface design: a Learner-driven Approach

To enable students to use this package successfully in a self-study situation, the learner-driven design was adopted as the guiding principle in the overall design of the program. According to Hoven and Farquhar (1996: 272), a learner-driven design "incorporates the best aspects of pedagogy while keeping the learner's needs and learner control as the focus". The overall design of Chinchar's interface is an example of this approach.

1. Instruction Icons: to ensure that students understand the instructions fully, and therefore are in total control of the learning process, the instruction icons are in both Chinese and English with simple, straightforward wordings. Most characters used in Chinese language instruction are the most frequently used ones of less complexity, and they are used repeatedly to familiarize the students with these instructions. For example, instead of using 上一页 to indicate the previous page, we used 前一个字符 meaning the

previous character, not only because the character 前一个字符 is easier to recognize, but also because I have used z* for the icon for ‘the story of the character’, 角色的故事.

2. Screen layout: Efforts were made to include as few icons as necessary on each screen to avoid confusion and distraction. For instance, only when the example icon is activated does the English translation icon appear. Care has also been taken to make certain that students have a good picture of the overall program by reducing the number of screens to the bare minimum. The first screen of the program is the main menu on which there are only five icons: Help, Creditors, Pinyin Index, Radical Index and Exit (Figure 1). One of the two index icons will take the learner to either the Pinyin or radical index page (Figures 2 & 3), and the third page is the activity screen (Figure 5).



Figure 1 The First Screen

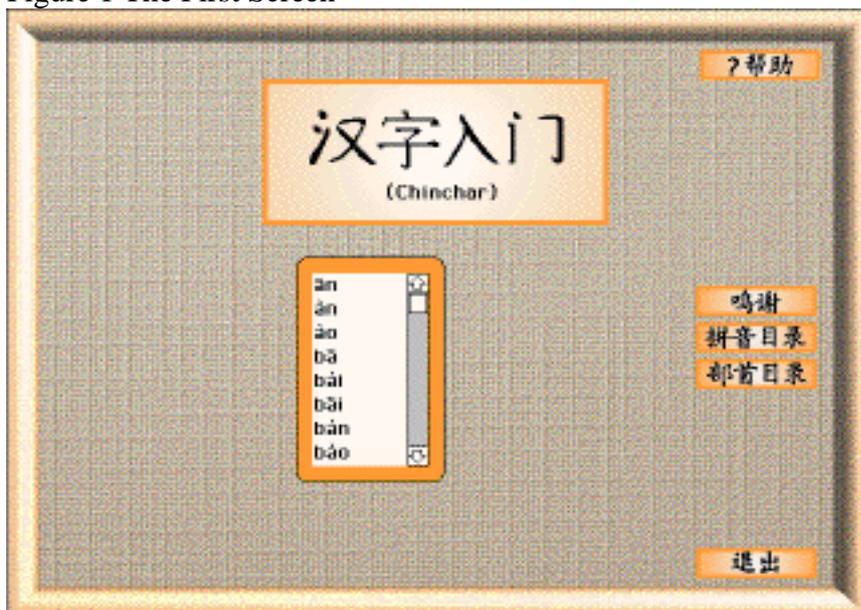
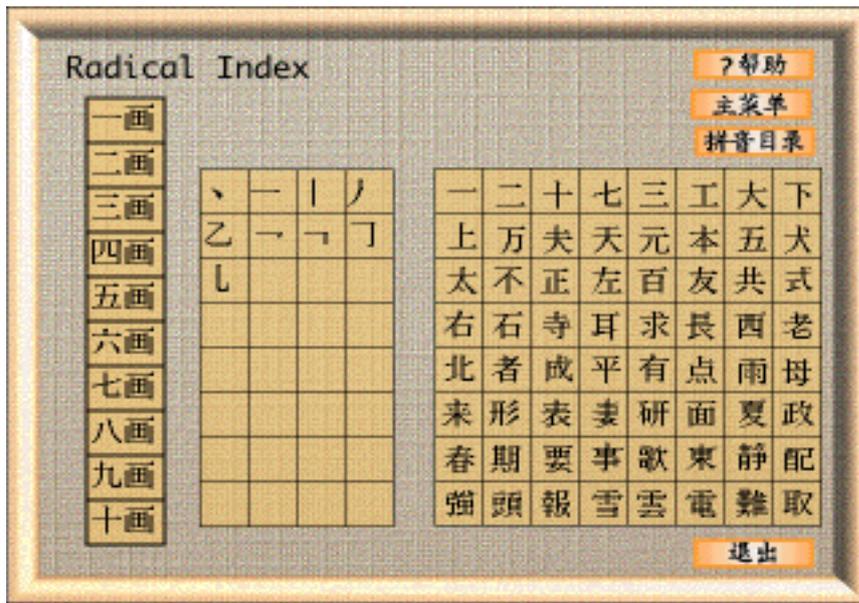


Figure 2 Pinyin Index Figure



3 Radical Index

3. Indexing: For ease of word checking, Chinchar was designed in the format of a dictionary. Both the phonetic alphabet (Pinyin) and radical indexes are provided for easy information retrieval (Figures 2 &3). The Pinyin index may be used by the beginner knowing only the pronunciation of a character, while a radical index may be used when only the written form of the character is known.

4. The “Help” Icon: to create an authentic Chinese learning environment, all the activity screens are in Chinese characters. However, to ensure effective control, especially in a self-study learning environment, a “help” function is built in to provide explanations in English to all the function icons for the beginners (Figure 4).



Figure 4 The ‘Help’ Function /Cultural Notes of an / Character Composition

The Teaching Features of the Package

Stroke order

To demonstrate the correct writing techniques for each character stroke by stroke, we adapted some of the video clips from an excellent multimedia package for learning Japanese Kanji (characters), the Stack Network Project CD-ROM, Vol. 1 including QuickDialog (March 1995). Copyright permission had been obtained from the authors, Shuji Ozeki and Masatoshi Sugiura, for the adaptation.

The learner can play the video as many times as they want and verify their writings against the video. These beautifully presented videos also offer the student a taste of real Chinese. Survey 2 show that the kinetic elements of Chinese calligraphy not only fascinate the learner but also increase their visual memory. It is a process of learning the basic character writing skills as well as one of appreciating the beauty of Chinese fine arts. (Figure 5)



Figure 5. Activity Screen and Stroke Order Shown by Videos

Pronunciation

Pinyin with tone marks was supplied to each character (see the upper left-hand corner of Figure 5), and its pronunciation was pre-recorded by the author so that students can hear the authentic pronunciation when they watch the video. To realize the principle of seeing, listening, and doing simultaneously, the play/replay icon also activates the sound/pronunciation. Thus while watching the video, students' auditory memory is also enhanced.

“The Story of the Characters”

An account of the historical evolution of each character is provided to assist retention and expose learner to culture implicit in the language. Most of the stories are derived from

Shuo Wen Jie Zi (Text Explanation and Character Interpretation) written by Xu Shen in about 100 AD. As the evolution of the character is explained, its formation is also analyzed by showing the radical and phonetic components, to familiarize students with the composition of characters, an essential skill for using Chinese dictionaries and Chinese word processors. At the same time, the learner is learning the culture and the traditional values of Chinese society. For example, the word 字 is shown to be formed by a roof 宀 and women 女 under it, symbolizing peace, safety, and stability (Figure 4). Here the cultural value of the ancient Chinese society is manifested clearly in that a woman's rightful place should be under the roof, the home, and thus the family and society can enjoy stability. All this information helps to improve the learner's language proficiency.

Usage of the characters

The central notion of the acquisition approaches is that languages can be learned effectively in a natural language environment where the language learner simply pays attention to the language as it is being used.⁴

To realise the role and importance of these approaches, three sentences containing the specific character are supplied so that the student can see the character used in context. The level of difficulty of the sentences ranges from elementary to rather more advanced to cater to different learners' proficiency. In the instance of 字, the following three sentences were given: Nǐ jiào shénme míngzì 你叫什么名字? (What's your name)? Tā de zì xiě dé hěn hǎokàn 他的字写得很好看(He writes beautiful characters), and Zhè ge zì zěnme niàn 这个字怎么念 (How is this word read) (Figure 6).

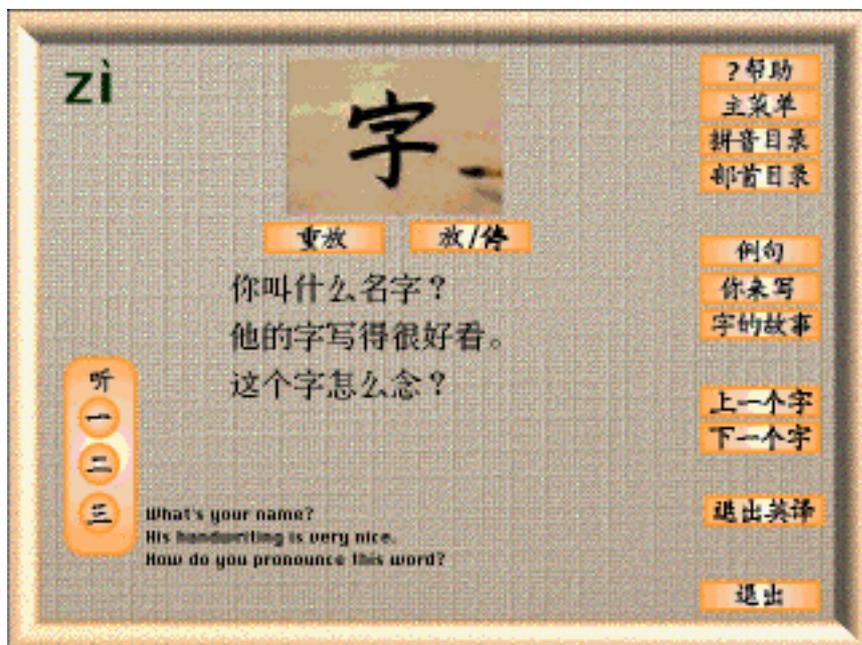


Figure 6 Sample Sentences with 字

In selecting phrases and sentences, idiomatic and frequently used terms of an Australian environment were preferred. Most Chinese textbooks used in universities in Australia are those published in China. With their emphasis on drills and grammar,

students often find them less than stimulating and inadequate in terms of usability of the vocabularies learnt; some of the expressions are also out-dated. Moreover, these texts focus on the experiences of foreign students studying Chinese in China. There is little available to cater to the level of proficiency and interest of Australian students of elementary Chinese here in an Australian context. Therefore, with the sample sentences, I tried to select phrases with which students could immediately identify and use often. For example, when introducing the character chē, 車, I gave the examples of Kāichē, 开车 to drive, and Zuò gōngchē qù, 坐公车去 to go by bus. There are phrases that students use almost every day.

The sentences were recorded by the author so that the student can develop active use of the language by imitating pronunciation, stress, and intonation. An English translation was provided for each example to further explain the usage of the character. (Figure 6)

The icon ‘it’s your turn to write’ (Lún dào nǐ xiěle, 轮到你写了) takes the learner to a ‘scaffolded writing pad’ built in the program. On the ‘writing pad,’ the learner can write the character on the computer screen with the mouse as they watch the video demonstration (Figure 7).

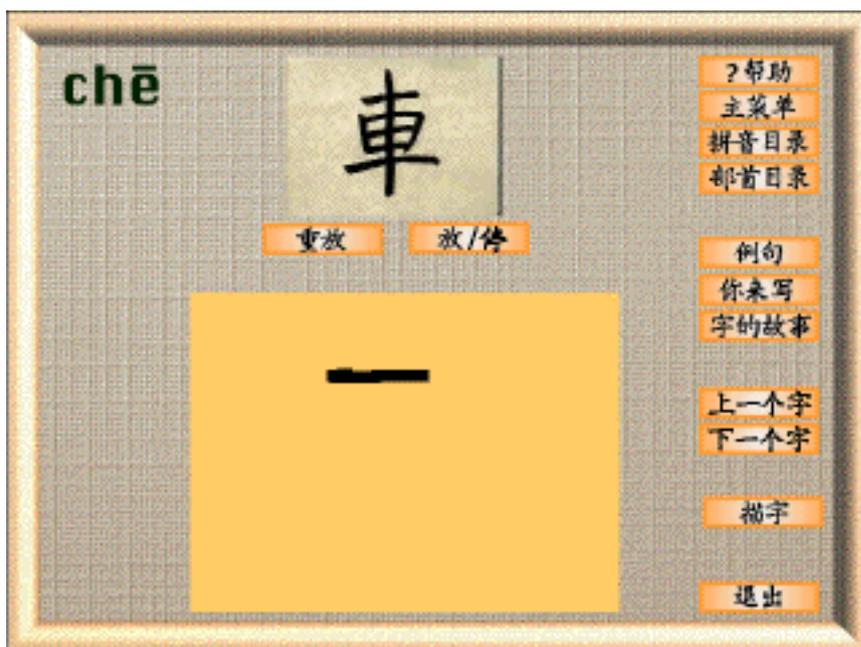


Figure 7 The "Scaffolded Writing Pad"

To ensure that the student writes correctly, a trace function, “scaffolding”, is available for students to trace over the character (Figure 8).



Figure 8 The Trace Function

Chinchar- Evaluation

The purpose of the evaluation was to see if Chinchar had effectively reduced those difficulties mentioned above, i.e. the enormity of the learning task, lack of in-class time, and outside class support. At the same time, students' perception of the comparative advantages and disadvantages of a multimedia mode of delivery over traditional classroom delivery of the same content was also sought.

Trial of Chinchar

The package was trialed with first-year Chinese students at Griffith University in semester 1, 1997, the great majority of whom were native English speakers with little or no prior knowledge of Chinese language. There was a small percentage of Japanese students who had learnt some kanji (characters) previously.

In the trial, between 10 to 20 minutes of the weekly tutorials were allocated to the use of the character package — Chinchar - for 8 weeks. Survey 2 was administered in the last week of the trial, and the response rate reached 90% with 40 returned questionnaires. Appendix A shows the data collected from this evaluation.

Findings

The evaluation produced several significant and interesting findings. First of all, students' overall response to the multimedia mode of delivery was unanimously positive: the package was described as “great” and “much needed”. Secondly, the evaluation results indicated that the multimedia mode of delivery may be the best vehicle to address the above-discussed problems in learning Chinese characters.

Solution to “a Difficult Task to Accomplish”

Although the number of characters to be learnt cannot be reduced, Survey 2 results show that Chinchar can reduce students' workload involved in learning characters. This is especially true with its cultural notes, known as “the Story of the Character” showing the evolution of and basic components in each character. Responses to the question about “the Story of the Character” show that only 2 out of 38 holds that these stories are not useful at all, and another 2 cannot judge whether they are helpful. The rest of the respondents were all very positive about these “interesting stories”, as put by one respondent, with the mean being 3.11 and standard deviation 0.92.

The high rate of satisfaction is partly because complicated as they are, Chinese characters are formed according to certain rules that can be followed. In other words, no matter how different one character is from the other, most characters share a common component with other characters, and each component has its meaning. Here are some examples: the word Lǜsè, 绿 meaning “green”, is formed with feng (harvest) 收 and yue (the moon) 月 This character forms the root component for many other characters. If a water radical (水) is added, it becomes a new character, 清, meaning clear as in clear water; if a heart radical (心) is put to the left of it, another new word is formed with the meaning of feeling 感觉. There are at least 21 characters composed of 清. The cultural notes in Chinchar help the students to analyze these regular features of characters, thus making the task of memorizing so many characters less formidable. The data in Survey 2 show that students enjoyed these stories and indicated they helped to improve their memory.

The video components in Chinchar proved to be the favorite part of the package. The students were delighted to be able to click on the video and watch the characters being written as many times as they wanted. Compared with traditional stroke order tables, the videos are much more lively and clear and make the learning process enjoyable and therefore easier. Last but not least, these videos offer instant feedback on students' progress in that students can verify their writings again and again if needed.

Another question stated that compared with the stroke order table in the Green Book, a reading comprehension book with a stroke order table at the back of each lesson⁵, which serves as a character writing textbook for first-year students, Chinchar makes stroke order easier to learn. Only one respondent disagreed. The mean was exceedingly high (3.34) and the standard deviation was merely 0.88.

The responses to a related question that “my memory of the character is increased when watching the video in Chinchar demonstrate the character stroke by stroke rather than seeing it written in a book”, were also strongly in favor of the videos with 32% agreeing to a great extent and 45% to a moderate extent. It would appear that the video components in the package compared favorably with conventional ways of teaching stroke order, such as stroke order tables. According to one respondent, one strength of Chinchar is “being able to watch the stroke order, which is sometimes confusing in the Green Book!!”

In short, Survey 2 indicates that the task of memorizing Chinese characters has been made easier with Chinchar.

Solutions to the Problem of Lack of Sufficient In-class Time

As argued previously, contact hours are limited, and it is unlikely that they will be increased shortly. Besides, the time has to be found outside of class hours for self-study because of the characteristics of character learning. A professionally guided and supervised self-study seems to be the best solution under such circumstances. The data in Survey 2 indicated that Chinchar is an excellent self-study resource offering flexibility in terms of control over the pace, time, and place of study.

Pace

A total of 83% of respondents believed that, with Chinchar, they could learn at their own pace, with a mean of 2.91 and a standard deviation of 0.95. Several respondents remarked on this point in particular:

- [one advantage is to be able to] go along at your own pace;
- [one advantage is] the interaction through multimedia at my own pace and leisure;
- [characters are] learnt at own pace;
- [One advantage is] to be able to see and hear the characters as many times as you want.

The responses to a related question also supported this result. 55% disagreed that Chinchar is not useful for learning characters in class, with a mean of 1.56 and a standard deviation of 0.74. In other words, even in class, with the teacher available for support, students still found they could learn better with Chinchar. This suggests that they can self-pace their learning by spending more time on those characters they are not familiar with and less time on those they already know. One student suggested: “Use it more in class”. During classroom trials, several students complained that 10 —20 minutes was not enough.

Time

The responses to the question that “Compared with classroom teaching, with Chinchar, I can learn characters at my own time” seemed to be quite dispersed at a glance, with a standard deviation of 1.47. The break up was 24% in agreement to a great extent, 29% to a moderate extent, and 21% to a little extent. However, the percentage still extends to 74% if we take the answers of “a little”, “to a moderate degree” and “to a great extent” as a positive answer to the question. The mean still reached 3. The reasons for this dispersion of data may lie in the problems that the students experienced with self-access. Chinchar at that stage was not available for sale. Apart from this, most students did not own a personal computer. Compared with the trouble of going to the computer lab at the University, picking up a book to learn the characters at home is handier and, therefore, more appealing.

Less pressure

When asked whether they can learn characters with Chinchar with less pressure, compared with classroom teaching, the majority of the response was positive.

Solution to the problem of lack of Outside-class Support

Instant feedback regarding the learners' progress is yet another advantage that multimedia can offer. A total of 90% agreed that Chinchar allows them to verify their writing against the video and make sure it is correct.

It can be inferred that Chinchar serves as a 24-hour-available teacher, who can show the students how to write the characters in the proper stroke order, how to pronounce the characters, how to remember the meaning of characters, and with whom they can check their writings. In short, it makes self-study more effective and productive.

Most importantly, it is more than a teacher in that it also individualized character learning. Students can learn their characters at their own pace and in their style. In other words, through Chinchar, students appeared to have the option for more individualized interaction with the materials than a teacher could offer in a traditional classroom.

Summary of findings

To summarize, data in Survey 2 show an overwhelmingly positive perception of the multimedia mode of delivery as far as learning Chinese characters is concerned. In conclusion, I quote some of the comments from the respondents on the strengths of Chinchar:

- It is great to watch the stroke order and listen to pronunciation at the same time;
- The video recordings of the stroke order and the tracing function are very useful;
- The character history, the bit on radicals, audio, and video, everything really except writing with a mouse is a lot different from writing with a pen.
- I feel the development story of the characters is very important. It helps me to remember the meaning.
- easy to use, stimulating and interesting;
- [Characters are] learnt at own pace and given in context; characters [are] explained;
- the clarification it offers and the accessibility as well.

In short, the students showed great enthusiasm for Chinchar.

Conclusion

With the advancement in educational technology and the increasing demand from industry for highly proficient Chinese language speakers, there is the 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. This study attempted to find out to what extent multimedia suits the teaching of Chinese characters, and how receptive the students are to this mode of delivery.

The first and major finding from this research is that the multimedia mode of delivery is well accepted and liked by the students. In the evaluation, it can be seen that students were fascinated by the advantages that Chinchar offers: stroke order shown through video clips, the sounds and trace function, above all, the overall control of their

learning process. This study confirms students' enthusiastic endorsement of the multimedia mode of delivery.

The second finding is that multimedia appears to be the best vehicle available to address the difficulties in learning Chinese characters. In other words, character learning has been proven to be a learning task well suited to computer-aided learning. Used in class, it adds new dimensions to classroom activities and fosters students' motivation and self-esteem by enabling them to control their learning. Most importantly, it caters to different learner abilities and styles. Used in a self-study situation, students can avail themselves of more time for effective character learning. Effective learning means that learning can be constantly verified and supervised to ensure its quality, which was only previously possible in the classroom. Thus their learning can be individualized to suit their 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 for such technology.

Lastly, it is hoped that the above findings will help to promote the development of multimedia in a number of ways. First, they will help to eradicate fears and distrust among teachers. Second, they will help to inform teachers and students of the importance of multimedia to second language learning so that multimedia can receive its due attention in Chinese teaching and learning.

In conclusion, the significance of this study is two-fold. Since there exists a lack of research into the application of this mode of delivery to Chinese language teaching, the findings of this study thus have, to a certain extent, bridged the gap between the theories of CALL and their applications to Chinese language teaching; Chinchar 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 the video clips, 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 study 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.

Notes

1. For the results of this evaluation, see Hoven, D., Farquhar, M. & Wang, Y. (1996). On Messages and Media, Clocks, and Cannibal Chiefs. In Farquhar, M. & McKay, P. (Eds), *China Connections, Australian Business Needs and University Language Education* (pp258-296). National Languages and Literacy Institute of Australia Limited.
2. For a full discussion on the "fit" between computers and learning oriental characters, see Chappell, E. (1993). *Computers and Learning Oriental Characters*. On-CALL, 7(1).
3. This grant was obtained by Dr Mary Farquhar and Dr Debra Hoven for developing *Video and Multimedia Package for Learning Chinese Characters*
4. See Newmark and Reibel (1968); Krashen (1981); Dulay, Burt, and Krashen (1982).

5. Introductory Chinese, Reading Comprehension. 1988. Beijing: Sinolingua

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