

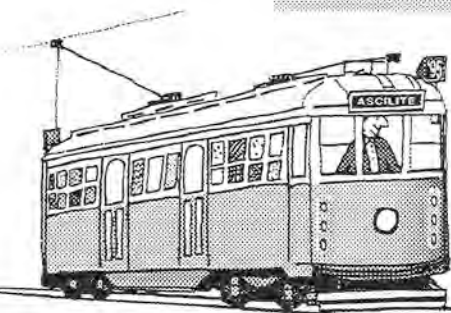
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A Creative Mandarin Tutor: Some Project Experiences

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Abstract

This paper details the design and development of a prototype Multimedia system to assist students learn the Mandarin language. Sound recording and playback, still and video images, and the use of contextual cultural components were included in the application. The system was developed by two honours computing students working in conjunction with academic supervisors. It provides an excellent example of the type of creative applied research that is currently being undertaken by tertiary students working in the multimedia field.

Issues of delivery platform and authoring tool selection are discussed. Reflections by both students and supervisors on the process of design and development of the prototype as an applied research project concludes the paper.

Keywords

multimedia, CALL, Mandarin, student project

1. Introduction

Much traditional Computer Assisted Language Learning (CALL) is grounded in a theory of language teaching and learning, adopting a structural approach. The emphasis is on language accuracy, with a focus on points of grammar and vocabulary (Barboux-Cooper, 1994). Usually the elements of this programmed instruction are not contextualised and are presented in predominantly text-based form. Whilst the reactions to such CALL systems are not entirely positive (McCarthy, 1993), such instruction on grammar rules and drill and practice routines are still well suited to use of the computer as a patient drill master.

However language teaching and learning theory has now moved to a more communicative approach. Language teachers now wish to create learning environments where 'Speech, sound and real world images become crucial elements in teaching language skills like speaking, listening, and proper use of the language in social situations' (Xi, 1994, p. 594).

The design and development of computer based courseware has progressed significantly from predominantly text based systems. Interactive multimedia has the potential to create CALL courseware that is ideally suited to the communicative approach. Using Multimedia to assist teaching and learning foreign languages really makes a lot of sense. Sound capabilities of the medium with record and playback features, video clips assisting contextual aspects of language and providing cultural flavours, as well as extensive user control and feedback facilities, combine to create a rich learning environment for the student.

This paper details the process of design and production of a prototype multimedia CALL system for Mandarin. The work on Creative Mandarin Tutor (CMT) was undertaken by two students as a project in an honours computing course. The paper's authors are these students and the two project supervisors.

2. Project Setting

Central Queensland University's Bachelor of Computing (Honours) program requires all students to undertake a substantial project, either 25% or 50% of the course. Project topics vary from traditional research theses that aim to expand the body of knowledge in the computing discipline through to more practical work.

The coursework component of the honours program provides focused study on several specific topic areas. Included in the available coursework are two units in Computer Applications in Learning and Training (CALT) (Clayton, Fraanads and Zelmer, 1993) as well as two units in Computer Human Interaction (CHI). Students enrol in the honours program after completing an undergraduate degree in Computing, Information Technology or Computing Science. The two CALT units address issues such as adult learning, user interface design, instructional methodologies, and do give a detailed overview of the scope of computer usage in educational and training applications.

Practical Computer Aided Learning (CAL) and multimedia projects allow students and supervisors to experiment with interface designs and instructional methodologies during the design and development of a substantial prototype application.

The two students involved in the current work undertook both CALT and both CHI units in their honours programme. The design and implementation of CMT contributed 25% towards the honours degree for both students. The four course units and project formed a coherent programme that provided a solid theoretical and practical understanding of CAL design and implementation.

3. CMT Design Objectives

The prototype is designed specifically for the non-Mandarin speaking person who may want to travel to a Chinese speaking country or community. It allows users to learn Mandarin in a short time without going through any formal lessons. This is similar to a tourist using a phrase book to learn phrases when the need arises, without paying attention to the structure of the language.

The users need not have any knowledge or experience in the Mandarin language. The lessons guide the users through in English. CMT is designed for the novice computer user, although some basic skills would be helpful.

4. Instructional Methodology

The design addresses the issue of preferred learning styles. Basically, three modes are presented: the linear approach, the experimental approach and a mixture of both. Considering the main design aim and the target audience, the experimental approach seems to be most appropriate for CMT. This approach allows users to select randomly lessons that they would like to attempt without following a predefined path through the lesson set. With this in mind, CMT lessons are designed to be independent of each other.

Every lesson is accompanied by drill and practise. Users complete the entire lesson before the drill and practice routine. In the drill mode, there is no time limit or scoring that might threaten or discourage the users. They try questions until they are satisfied with their performance. Users are permitted to leave or choose another lesson at any time.

Along with the main lessons, and the drill and practice routine, a 'coffee break' mode is always available. As the name suggests, 'coffee break' is activated by users when they want to take a break from the current lesson. Basically, this mode is a list of brief documentaries the users can select to watch or listen. Documentary topics include aspects of Chinese culture, tradition, art, and sports. The coffee break concept was borrowed from Christensen, McNutt and Wilks' (1991) who used a hypermedia approach for retraining teachers in the Japanese language. There are no drills or exercises

in this mode and it is not considered as a proper lesson. These coffee break documentaries act as educational material that complement the lesson modules.

4.1 Lesson Design

The lessons are made up of a still scene or a simulated visit to places such as the airport and a restaurant. The intention is to present the vocabularies or phrases related to that scenario. These scenarios were carefully selected to ensure their usefulness and relevance to intended users.

There are three modes of presenting the lessons in CMT: still images with audio, the use of video clips with audio, and still images with interactive dialogue. Each mode was used to experiment with individual multimedia components.

Still images with audio are used where single words are introduced, for example, the name of objects and verbs. Users are allowed to 'walk through' a scene and explore by clicking on an object (Murray, 1989). Once these objects are activated, the proper pronunciation for this object will be read aloud. A garden scene is used for the still image mode.

Lessons created using interactive video with audio presentation offer an environment in which users are supported while trying to understand material that would otherwise be too difficult (Murray, 1989). One of these supporting methodologies is the use of 'karaoke' styled highlighting of text as dialogue is taking place. As the dialogue is spoken aloud, users are able to see each word as it is spoken highlighted in a different colour. The video controls, which enable users to playback, fast-forward, rewind, and pause, provide interactivity.

The third method of presentation uses still images in conjunction with interactive dialogue. This allows users to have a high level of control over the characters in specific scenes. Users may select the character to speak, and repeat certain phrases without having to go through the entire dialogue. Power Japanese (Bayware Inc., 1992), a commercial CAL product, uses speech-balloons to indicate which character is currently speaking. The authors extended this idea by embedding audio controls (that is play, rewind) in the balloon itself to allow users a higher level of interactivity.

4.2 Drill and Practice

Drill and practice routines reinforce user's learning (Alessi and Trollip, 1991). A recorder utility is provided in every lesson. Users can activate the recorder utility at any time during the lesson mode to record their own dialogue so it can be compared with that in the lesson. This recording utility serves as a good tool for users to practise and evaluate what they have learned.

In one drill routine, users are required to identify what is said in a video clip. Users select the correct answer from four given choices translated into English. This is a modified version of the traditional multiple choice answer drills (Alessi and Trollip, 1991).

4.3 Screen Design

The screen is divided into three functional areas: the primary instructional area, the secondary instructional text area, and the control buttons (see Figure 1). The primary instructional area is the largest portion, taken up by the main multimedia instructional material, for example still images and video clip.



Figure 1. A Visit to the Garden.

Right beneath the main area is the instructional text, used to display Chinese words, the Chinese Phonetic Alphabet words and the English translation. There is also a bar of context sensitive help at the bottom. The context sensitive help provides information and instruction corresponding to the object currently pointed to by the mouse.

On the right of the screen is a strip of control button icons. These controls provide options of female and male voice output, the recorder utility, drills, coffee break, dictionary, help, and main menu map.

5. Delivery Platform

The delivery platform used for CMT was an IBM PC compatible equipped with multimedia hardware running under Microsoft Windows 3.1 (see Figure 2 for full details). The Department of Mathematics and Computing run predominantly Windows based computers, so this was the logical choice for hardware and software development tools.

| | |
|-----------------|-------------------------------------|
| Computer type : | IBM PC / 486DX-33 compatible |
| Main memory : | 4Mb |
| Hard-disk : | 240Mb |
| VDU : | 640x480 resolution with 256 colours |
| Input device : | Dynamic microphone |
| Output device : | Speakers |
| Audio device : | Creative Sound Blaster Pro |
| Video device : | Creative Video Blaster FS200 |

Figure 2. Multimedia development platform.

6. Authoring Tool Selection

An initial survey was carried out on several in-house and commonly available authoring tools. Some of the commercial tools, for example Macromedia Director and Asymetrix ToolBook, required a steep learning curve before actual work could commence. The authors discovered that many commercial multimedia tools produce designs such that a similar overall 'look-and-feel' occurs, thus hindering creativity.

Microsoft Visual Basic 3.00 Professional was selected as the authoring tool. Although Visual Basic is a general purpose programming language and not a specialised multimedia tool, it provides functions that would allow the incorporation of multimedia features. It also allows flexibility for the authors to develop CMT without the 'look-and-feel' constraints of other authoring tools.

7. Resources and Content Material

CMT comprises resources that include spoken English and Mandarin phrases, still-photographs, still-bitmap images, icons, video clips, audio clips and background music.

Spoken phrases were first recorded on a portable cassette recorder and transferred to the computer using an audio capture device. Actors were video taped performing the required scenes for the video clips. These clips were then transferred onto the PC using a Creative Video Blaster video capture device. Still-bitmap images were taken from a clipart collection while still-photographs were shot using Apple's QuickTake 100 digital camera.

8. The Prototype

The CMT prototype includes three lessons; namely: A Visit to the Garden, Arrival at the Airport and At the Restaurant.

A Visit to the Garden employs still-bitmap clipart images depicting objects commonly found in a garden. The name of an object is read aloud in Mandarin whenever the mouse pointer is clicked over the selected hotspot. At the same time, the Mandarin and English words for the selected object are displayed at the bottom of the screen. A male or female voice can be selected to read aloud the object names by toggling the male and female control buttons from the side menu.

The Arrival at the Airport lesson uses digitised photographs and a dialogue between a passenger and an airline booking agent. The English equivalent spoken dialogue is depicted as text in cartoon style balloons. To play the Mandarin version of these dialogues, users click on the 'play' buttons associated with each dialogue. Users can play the dialogues in any order.

In the Restaurant lesson, a video clip of two customers and a waitress is used. Full control of the video clip is possible by allowing the user to rewind and replay any section. In drill mode, the user watches video clips of the actors speaking Mandarin phrases that have been previously used in the main video clip. The user is then asked to select the correct English equivalent of the spoken phrase.

In all three lessons of the CMT prototype, users can activate a built-in recording feature. This recording feature allows realtime recording and playback of the user's own voice. The 'coffee break' documentaries are presented as still pictures or video with accompanying narration.

9. Reflections on the Project Process

Both the students working on this project were concurrently developing either computer aided learning or multimedia courseware for assessment requirements in the CALT and CHI units. The supervisors had several years experience with both honours and undergraduate student projects and externally funded and commercial projects in CAL. Despite this experience, all found the CMT prototype design and production time consuming and intellectually challenging.

All parties agreed that the design phase was the most difficult from both a process management and intellectual challenge point of view. Most of the first semester was spent on design. The full-time honours course structure was such that the students were studying their coursework subjects at the same time as working on design. These subjects contained the very theory on instructional methodologies and screen design that the students were trying to come to grips with to design the prototype! Unfortunately this coursework, which was really prerequisite knowledge, had to be done in parallel with the project.

It is difficult to see how to overcome this situation in a one year full-time honours course. Moving all coursework into semester one and the project into semester two would not solve the problem. The design and production work, the development hardware and software location and acquisition, and

the attendant resource collection simply could not occur in a four to five month timeline. In fact, the oriental scenes and video clips were quite difficult to source.

The skill mix of both the students and the supervisors worked well. One student and one supervisor had strength in the design aspects of the project whilst the other student and supervisor had good production skills. The production of such a detailed prototype was made possible by this breadth and depth of skill mix in the "team".

It has been the supervisor's experience that it is difficult to contain such projects to the set semester time. This project was no exception! It was clearly over-ambitious to design and produce such a detailed prototype within the time frame. While not wishing to quell the students' enthusiasm, the supervisors should have exercised more control over the prototype boundaries.

Despite these challenges, all parties found the project a valuable, if not exhausting, learning experience and both students are now undertaking higher degrees, researching multimedia!

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