Towards a Multi-Language Teaching Model of IS

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ABSTRACT

One of the potent technological developments has been the advent of the Internet and its ability to facilitate rapid computer-mediated communication. Initially communication via the Internet was available only in English. However, with the current force towards a global use of the Internet, vast progress has been witnessed in the use of various languages, the European languages being an early addition. Asian languages that used glyphs rather than characters were more of a challenge. An interface with a mixed language facility was almost impossible until the adoption of the Unicode (ISO/IEC 10646) glyph standard. The authors experimented with the integration of English and Chinese in the delivery of an Information Systems course to test the standard, an initial stage to be followed by further tests with more languages. The simplicity and effectiveness of the development process makes the method a useful and time-efficient teaching model for developing a course requiring multi-language information. It can also be used as an international teaching model on the web with alternative language presentations.

1.   INTRODUCTION

This paper is based on a research conducted in early 1999 with the intention of finding a solution to offering international students on-line support on their university courses. The authors examined the latest technology available that facilities the presentation of teaching material in more than one language semi-concurrently. This leads to the construction of an instructional model with multi-language, multi-media features.

2.   BACKGROUND

There were some practical considerations when we started the project. It initially derived from our wish to provide some help to those international students with language problems. We discovered from our own teaching experience that even though these students had to meet the English requirement for enrolment, the requirement being either Band 6 in the International English Language Test Syndicate (IELTS) or over 570 in the Test of English as a Foreign Language (TOEFL), they still have to struggle through a second or foreign language to acquire and understand new concepts. We found there was often a lack of up-to-date technical terms in the inter-language dictionaries available to the students. Unfortunately, the lack of knowledge of the new culture and unfamiliarity with some lecturers' "regional accents" also added to the difficulty in understanding lectures in class. If the assessment of our students is based on criteria rather than performance, there is strong reason for the knowledge

facilitator to provide more than one means of instruction, currently classroom instruction being the main stream, to help students' learning. Meanwhile, special consideration must also be directed towards the international students' group. It certainly helps international students enormously if some means of help in their own language is available at their initial stage of exploring a new subject area. Since the pros and cons to the idea of providing first language support is outside the scope of this research objective, we will not provide arguments here.

The second incentive came from the awareness of the internationalisation of tertiary education, which will rely heavily on the Internet and World Wide Web technology. Bork (1999) predicted that the future of education would feature highly interactive, highly individualised, and highly flexible interaction with computer-mediated education replacing (not supplementing) campus-based education.

While there is hardly any doubt about the potential of web teaching. The language media is mainly tied up with English and European languages. Little research has been conducted in the area of Web teaching with other languages, especially Asian languages. Hardly any is published in the area of mixed language presentation via the Internet. Is it also possible to deliver a course with a mixture of languages? To what extent can this be done? To find out the answers, we started this project. We defined the objective to be research on the best solution available within the existing technology for mixed language presentation. This was to be done within the framework of conducting an Information Systems subject. We found the framework a critical factor for evaluating an adopted solution.

3.   RESEARCH METHODOLOGY

The research involved two stages. The first was the searching of the available technology to support mixed language prevention, the tools and applications that could be deployed and the platform compatible. This was a rather technical process that involved a lot of testing. The second stage was to experiment with an existing Information Systems paper to find out the most cost effective and time efficient method of setting it up on the Web.

4.   TECHNOLOGICAL FEASIBILITY

The Internet was initially employed in America in the 1960s for military purposes. As a result, it was originally only designed to support the 'American' variant of English, following a 7-bit ASCII standard. However, with the extensive use of the Internet technology, the standard immediately revealed its limit. It could not even represent the British money symbol "£", let alone many other symbols found in the European languages, such as ç, ê, ö etc.. This need was the drive for development. In the 70s, an 8-bit ASCII standard was introduced, which allowed a doubling of the number of characters supported by the 7-bit ASCII standard. These were used for the extra characters needed for European languages. They could also be used to support local variants, e.g. to represent Thai or Hindi characters. However, the problem with this new standard was two-fold. Firstly, it still could not support the representation of many other Asian languages, such as Chinese, Japanese, and Korean etc. Secondly, the regional uses of the standard were often mutually incompatible. For example, if the Thai and Devanagari alphabets were both locally mapped into the 128 to 255 area of the 8-bit ASCII standard, and there was any overlap, both locally modified standards would work well in Thai/English and Devanagari/English mode, but direct Thai/Devanagari communication would be difficult. As a solution to the problem, which covers both the addition of language support and, mainly, the incompatibilities, Unicode was specified. The Unicode Consortium (1996) aimed to represent all of the world's main human languages, about 25 language groups, in its total definition of 40,000 characters/glyphs. Fortunately, Unicode underlies both the Macintosh and Windows operating systems, but not, we are told, many UNIX systems, (although Sun Microsystems Inc. (2000) comment that Solaris 7 does offer some Unicode support and Haible (1999) commented that Unicode capabilities were starting to be added to Linux). Also versions of HTML beyond 3.2 will leave what Alis Technologies Inc. (1996) call "the ASCII stone age" and will be based on Unicode, Pavliscak (1997).

Finding the language fonts was the second part of the technology research. As we had knowledge of some Asian languages, we started with a search for fonts we could identify. We found several free CJK (Chinese, Japanese, and Korean) fonts on the Internet. We downloaded several and found some from the Microsoft web-site the most useful. The decision on Asian character

input took some time. We found a free application called Global IME (Input Method Editor) in the Microsoft web site, which promised the pinyin method of Chinese language input. The useful feature of this package was its compatibility with Outlook Express in HTML mode, which enables the exchange of e-mails that use a mixture of English and Chinese glyphs. However, after some experiments, we concluded that it only worked at an 'acceptable' rather than a 'good' level. The problem lies in its small vocabulary and the limitation on the input method. We then examined an application called NJ Star and found it a much better choice. Firstly, it provided more than one input methodology for Chinese in classical version as well as simplified version. Secondly, it supported a larger vocabulary. Thirdly, it supported the input of Japanese and Korean in addition to Chinese. Fourthly, it is compatible with Microsoft Word 97. The only disadvantage is that it is a commercial package, and hence not available for free download by students.

The third part of the technical research concerned the voice-input facility. We wanted to explore the possibility and potential of providing multimedia help through a Web course. New technology offers a spectrum of multi-media support over the Web, from video to images or sounds. However, for some practical considerations, we found it was more feasible to limit the research on the sound. After investigating several options downloaded from the Internet, we used free Microsoft software that facilitated voice recording. We attached voice annotations on word documents and PowerPoint slides and found them still accessible in the Web environment.

In the process of the research, we also felt an impending need to set an environment to experiment with the findings. We chose a tertiary institution as the setting. This choice brought in the consideration of cost and time. We found that tertiary institutions, like all other budget-conscious organisations, have to make a balance between what is best and what is affordable. The financial problem applies to both the institution and the students. We operated within a limitation that all solutions should be based on the already available resources accessible by both lecturers and students. Also, lecturers' time needed for the change of teaching mode is another critical factor. Since obtaining full-time expert support is not an option, any method that requires a steep learning curve or a lot of time on the part of the lecturers can hardly be welcomed with open arms. We wanted to find a method that could by-pass the learning of web technology, such as HTML, Java, JavaScript, Perl, ActiveX, XML and URLs. Though they facilitate the production of beautiful and stimulating web sites, they take too much time to learn in practice.

5. BUILDING A WEB INSTRUCTIONAL MODEL

5.1 Methodology Adopted

The methodology finally adopted was mainly based on variations or additions to the Office 97 products already in use by students and lecturers for lecture and assignment production. The presence of these on the student's and Laboratory computers, plus the use of Internet Explorer, allowed a solution to be developed quickly and with little effort. We built a trial model in producing documentation for some lectures in a first-year first-semester Information Systems course by going through the following steps.

5.2. Conversion to Lecture Overheads

We found that by using Microsoft Word's 'Outline' facility carefully, we would be able to automatically convert the word documents into PowerPoint slides. This applies to both English and Chinese versions. The Word 97/PowerPoint 97 conversion had the restriction that, while we used roman fonts and two Chinese fonts in Word 97 documents, only one Chinese font could be added to the roman fonts in PowerPoint 97. The English and their Chinese slide translations were cross-linked at this stage. The result worked nicely.

5.3. Adding Voice Annotations

English and Chinese voice annotation were then added to the Web slides. The free software had the limitation of allowing only one minute of narration to be recorded at a time. This limitation required a more concise lecture presentation, which, when combined with a greater number of slides than we usually used, resulted in a presentation which students rated as preferable. It also resulted in a considerable saving of time. The problem with this free software was that the voice files were large, which could affect the loading time for a Web course. We are still looking at the usability of various compression methods.

5.4. Conversion to a Web Site

Next came the attempted Web conversion. A Web site was produced using a FrontPage menu option. Theoretically both Word 97 and PowerPoint 97 documents can be saved in HTML format, ready for use in a Web site. However, the result was far from acceptable. The converted document appeared in a format that frequently required much further work. We obtained an estimate for the time to 'clean up' a 16-page Word document's HTML conversion ready for web use. Two WebCT users independently estimated 3-5 hours, and this also requires a good knowledge of HTML. With PowerPoint 97 slides, the problem is even more serious. The converted HTML version eliminated both the voice annotations and the Mandarin fonts. As a result, saving all the existing documents in HTML format to be transferred to the Web is a disaster in practice.

Knowing that in the tertiary environment, the majority of users and all the Information system students had Office on their computers, we found a better solution. We could link the original Word document to the web directly using FrontPage. This had the advantage that the word document could be pulled up directly via the Web, side-stepping HTML's limitations (e.g. allowing the use of facilities like multiple columns, headers, footers, formulae, fine font control etc. that are usually used for formal academic publications). The main disadvantage was that, while Internet Explorer accepted this format, we could not get the Netscape browser to work well with this web. Given that this method of making the document available via the web took not 3-5 hours but half a minute, we pragmatically, but regretfully, accepted this limitation. The same linking method worked well for the PowerPoint slides, facilitating (with similar time savings) the use of both voice annotations and Chinese ideographs from the Web site without any further conversion work being required.

5.5. CD-ROM Production

As an alternative version of the on-line web lecture notes, we sought the solution of making CD-ROMs of the Web site. The resultant Web was implemented in such a way that the student could click on a Web page icon to get the English web page quickly replaced by a Chinese version of that page. Clicking on a similar icon on the Chinese page would take the student back to the English version. If the slide or page (e.g. a graph) had voice narration, clicking on the voice icon for English produced an English commentary, clicking on voice icon for

Chinese produced a commentary in Chinese. We used the CD-ROM version of the Web course experimentally in several lectures and there was positive feedback from the students.

6. ADVANTAGES OF THE METHODOLOGY

The methodology adopted had the serendipitous effect of offering advantages to all students, as well as the ones who did not have English as their first language. Looking at the advantages: -

♦ Mixed-language presentation is possible using Microsoft Office 97/FrontPage 98.

♦ Technical terms could be defined and explained in both the student's original language and in English. This aided understanding, and the students concerned commented it also helped their grasp of English.

♦ The methodology, if followed, involves only one entry of material by the lecturer for each language used. Since some of the other methodologies involve either re-entry of material, or substantial subsequent text editing, lecturers particularly appreciated this feature.

♦ Even if no second language is used, use of this methodology is beneficial compared with some of the other available methodologies. It makes it possible for an interested lecturer to make paper, lecture overheads, CD-ROM and Web facilities available without the lecturer having to work 'heroic' hours, and without the lecturer having to edit language files, (or even to know what terms like URL, XML, or HTML mean).

♦ The lecture material can be made available for student use asynchronously with the lectures, via paper, CD-ROM or the Web.

♦ A variety of delivery methods was available for use in sending material to international students.

♦ The FrontPage Web template used for this web also automatically includes the ability to search the web site (resulting in a list of clickable web pages); submit a bug report; submit a suggestion; contribute to a threaded discussion; and to be able to download files and documents automatically.

♦ The resultant Web offers a high availability. The FrontPage methodology involves the lecturer editing the Web site on the lecturer's own computer via FrontPage's Word-like editor, and checking that the revised web site is satisfactory before using a menu option to 'publish' the corrected and checked web to

a server. 'Publishing' in our experience takes only a minute or two, whereas editing and checking the web site 'on-line' (e.g. modifying text and HTML) could make a web site effectively unavailable for an hour or more. Editing the web on the lecturer's computer also means that, apart from the contents of the threaded discussion groups, there is always an on-line backup of the web site available for use if there are problems. All this is done without the lecturer having a need to know a computer language.

♦ If Internet Explorer 4 or 5 is used, Office documents can be pulled up directly from the Web site, allowing the considerable layout limitations of HTML to be bypassed.

♦ Corrections or changes can be promulgated easily. Students can 'subscribe' to a "what's new" web page, and be automatically notified when a change is made. This obviates the need for a lecturer to have to send e-mail notifications of changes to students.

♦ Since the methodology uses mainly extensions of presently used facilities, the extra cost to both the students and University was minimised.

♦ The methodology had the serendipitous result of allowing multi-language e-mail.

♦ The fact that Unicode underlies the PC's operating system makes it theoretically possible to use any of the presently defined 25 or so languages as the primary teaching language, mixing and matching with any of the others for second-language presentations. In practice this versatility is limited by the fonts and input methodologies available.

7. After-Thoughts

The authors found this an interesting project. The methodology adopted proved practical, producing results that were rated by the Chinese students in an informal poll as being very useful. The students commented that understanding and learning the material was much easier in this subject than their other first-year subjects, whereas previously international students had rated this subject as the most difficult of their first-year subjects.

Interestingly, when asked if the provision of help in Chinese beyond the first year was preferable, the Chinese students commented that part of their purpose here was to learn English, and so in years beyond first year, they hoped that provision of this sort of help would not be necessary. Application of the methodology also produced results that were of use to the other students in the class, in that lecture material in several forms suitable

for asynchronous learning became available. Students who, for a variety of reasons, could not attend all the lectures valued this.

It was a disappointment that the Web site could not be made accessible by a Netscape browser. However, the time savings obtained were so considerable that we felt justified in using the approach adopted. We have subsequently also had access to Adobe Distiller. This proved able to handle the Chinese Word files well. It could not handle the sound facility. Theoretically, this methodology is not restricted to English-first-language applications. It is available for all of the languages supported by Unicode, and could be useful for language classes.

After the formal project had ended, a beta evaluation copy of Office 2000 and FrontPage 2000 became available. Many of the restrictions noted above have been removed in this newer version. The Word 97/PowerPoint 97 conversion restriction that limited PowerPoint 97 to one Chinese font (plus roman fonts) has been removed in the Word 2000 to PowerPoint 2000 conversion. The Word 2000 to HTML conversion is a big improvement, but is still not perfect. The PowerPoint 2000 to HTML automatic conversion now handles Chinese, but not sound. Although we did not use it in this particular application, it may be of interest that Access 2000 (unlike Access 97) also has the relatively unusual ability for a database of being able to use Unicode, thus allowing multi-language databases that include CJK glyphs. The main improvement however, which would have been a real boon to us, is that multi-language use in Office 2000/FrontPage 2000 is now well documented. This should considerably ease the initial load of any implementer who wishes to take a similar path to the one discussed above.

8. CONCLUSION

Although the environment chosen for this project severely limited the author's options, a solution was found that, while not ideal, showed promise. It was implemented, tested, and was shown to produce results that were both acceptable and useful in practice. This methodology shows encouraging signs of being a useful methodology for developing multi-language lessons with low-cost and minimum effort.

# 9.	REFERENCES

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