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Evaluation of Online Courses developed in China

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ABSTRACT :

The purpose of this study was to investigate the quality of the online courses developed as a result of national projects in China. A total of 31 online courses were evaluated from the pedagogical, social, and technological perspectives. The results showed that the pedagogical design and the technological design of the online courses were sound. Comparatively, the social design aspect was weaker and needs to be further enhanced. This paper presents the context of online course development in China, the design dimensions of the online courses, and the evaluation results of the online courses. Suggestions for adoption in the development of future online courses are provided.

1. INTRODUCTION :

The present tertiary education in China faces two major challenges. One is that a large number of students who have graduated from senior secondary schools cannot go to universities : China has a huge population of more than 1.3 billion. Nearly ten million senior secondary school students graduate each year, and although the enrollment into universities and specialized colleges has been increased tremendously in recent years, a great proportion of school graduates still cannot enter universities. For instance, 9.50 million school students graduated, and about 4.20 million (44.2%) were rejected by tertiary institutions in 2006. How to enable these students to receive continuing education becomes a challenge.

The other challenge is that universities commonly lack high-quality educational resources. According to the China National Bureau of Statistics (NBS), the population of university and specialized college students reached 13.3 million in 2004 (NBS, 2005). However, available education resources such as reputable professors and high-quality learning materials are limited. As a result, students in various universities hardly have equal opportunities to benefit from the limited resources.

The Ministry of Education (MOE) believes that these challenges call for the establishment of online educational institutions and high-quality online courses. The students who are unable to enter universities will then have an additional chance to attend online institutions' programs, and those students who have been enrolled in traditional universities will have more opportunities to continue with high-quality education.

The foundation of online educational colleges was initiated in September 1998. The MOE granted online education licenses to four universities (Tsinghua University, Beijing Post and Telecommunication University, Zhejiang University, and Hunan University) as the first pilot batch of higher educational institutions. In the same year, the students enrolled in the online educational colleges reached nine thousand. Until now, 68 universities in China have established online educational colleges and the number of student enrollment has reached 0.84 million in 2004 (NBS, 2005).

The new online educational colleges are

basically offering three programs : special training diplomas, undergraduate degrees and master degrees (Zhu, Gu & Wang, 2003). The special training diploma programs are offered to those students who did not pass the university entrance exams. They will get special training diplomas after getting sufficient credits. The undergraduate degrees are mainly offered to those special training diploma holders who want to upgrade their certificates to bachelor degrees. The master degrees are provided to in-service teachers who have bachelor degrees.

The majority of online education colleges adopt a blended instructional model to deliver courses. Each course usually has a web site, which lists its syllabus, learning schedule, and suggested reading materials. Some colleges have even videotaped lecturers' presentations and put them online for remote students to view. In addition, students occasionally attend face-to-face lessons that are conducted in local learning stations. These lessons are delivered by the course lecturers or local tutors trained by the online educational colleges.

Since the establishment of their online educational colleges, these universities have put great effort into building networks and into the construction of learning resources. However, the quality of available online courses is low. The Higher Education Department (HED) of MOE initiated a national project in 2000, namely *Constructing High-Quality Online Courses for the New Century*. The aim of this project was to develop about 200 high-quality online courses in two years to guide the development of other and further online courses (Fu, 2004).

More than one thousand online courses have been awarded elite or high-quality courses since the launch of the national projects, and increasing numbers of online courses are being developed. In this study, some of the courses have been investigated from various design dimensions, and suggestions for broadly developing online courses are recommended.

Research has suggested that online course design should focus on the three essential dimensions ; - pedagogical, social, and technological (Chen, 2003; Kirschner, Strijbos, Kreijns & Beers, 2004). These are introduced here in turn.

1.1 The Pedagogical Dimension :

An online course is a web-based learning environment in which learners can explore, experiment, communicate, and construct knowledge. The pedagogical dimension is critical for distinguishing an online course from other networked communities such as an alumni or a sports-club community, as it primarily reflects the educational purposes of the course (Chen, 2003). In order to differentiate an online course from other learning environments, the pedagogical dimension of an online course must: (i) support and satisfy learners' needs and learning intentions; (ii) involve learning resources and activities that support constructive learning; and (iii) be flexible in the learning content and objectives (Chen, 2003 ; Kirschner et al., 2004). Specifically, an online course should incorporate the following pedagogical specifications.

First, an online course should provide clearly stated learning objectives. It is not advisable to set up identical goals for all learners for they may have different backgrounds and hence interpret the same content differently. However, an online course ought to suggest clear learning objectives to guide students. Moreover, these learning objectives ought to be flexible and negotiated (Chen, 2003 ; Hirumi, 2002). Signing learning contracts between the instructor and learners is a good example of promoting flexible learning objectives (Codde, 1996 ; Knowles, 1986).

Second, an online course should suggest initial learning materials and enable learners to add more supplementary materials. The Internet is a huge repository of information resources. Not every information piece on the web, however, is valid and reliable. The initial learning materials and recommended learning resources can ensure a sound starting point for learners. The resources can be presented in web pages, Word documents, or PDF files. In addition, there must be a reciprocal relationship between an online course and its users (Kirschner et

al., 2004). Learners should not just obtain resources from the environment without contributing additional materials. Adding extra materials to a learning environment will benefit other learners and also make the online learning environment more sustainable.

Third, an online course should enable learners to reflect on what they have learned. Research identifies that writing online reflections has the potential to promote student critical thinking and knowledge construction as they have time to think further and analyze information critically (Smith & Johnston, 2002). Nevertheless, research also reports that not all students think critically when they are writing online reflections (Wang, 2005). Sufficient scaffolding and feedback should be provided to guide them through the writing process (Johnson & Aragon, 2003). Currently many free tools such as e-blogger (http://www.blogger.com) allow students to write online journals and reflections.

1.2 The Social Dimension :

With the rapid development of computer mediated communication (CMC), the social dimension has become an integral component of online learning environments. People naturally live and work in various communities, in which they turn to others for help when they encounter problems or any difficulty (Jonassen, Peck & Wilson, 1999 ; Wilson & Lowry, 2000). The use of CMC has made social interaction on the Internet more convenient and flexible than ever and this has led to dramatic growth of computer-supported collaborative learning (CSCL) in recent years. Various CMC tools (such as discussion forums, chat rooms, email, video-conferencing, and weblogs) are now available to support social interactions through the Internet. The social design of an online course aims at: (i) providing a comfortable environment, in which learners can communicate conveniently with others; and (ii) ensuring the communicational process is safe and smooth so that learners are willing to share and also able to get prompt responses from others. Specifically, the following design principles are helpful for the social dimension of online courses.

An online course must establish clear ground rules or norms for communication. To keep an online learning environment sustainable, setting up ground rules or norms for communication is essential (cf. Backroad Connections, 2003 ; Chen, 2003). Suggested ground rules include netiquette, the minimal number of postings each participant should contribute, compulsory responses to comments received ; and a proper closure given at the end of a discussion.

An online course should support various types of communication such as synchronous and asynchronous communication. Due to the lack of tutor's social presence, students often feel isolated and they particularly need immediate interaction and expect existence of the instructor in an online learning environment. Real-time synchronous communication can support high immediacy of feedback and social presence. In an online course, real-time communication can take the form of textual chat, voice conversation, or video-conferencing. Asynchronous online discussions have the potential to promote the co-construction of knowledge by the learners and support the rapport levels since students can remove aggressive sentences to avoid unhappiness before publishing messages (Hara, Bonk & Angeli, 2000 ; Powers & Mitchell, 1997). In an online course, asynchronous communication can be presented in a form of threaded group discussions, personal messages, or a question-and-answer (Q/A) facility.

An online course should encourage group collaboration and instructor moderation. An online course often involves complicated project-based work or other teamwork. Individual accountability and positive interdependence are primary requirements for successfully collaborative learning (cf. Kirschner et al., 2004). An online course must provide a means for the instructor to monitor each learner's individual contribution as well as the overall group collaboration (Backroad Connections, 2003; Hung, Tan & Chen, 2005 ; Lim, 2004). Basic moderation skills include setting up

discussion forums and questions, motivating students, encouraging and fostering social interaction, asking questions, and providing comments and feedback (cf. Collison, Elbaum, Haavind & Tinker, 2000).

1.3 The Technological Dimension :

An online course certainly involves a technological dimension because it is a computer-based technology-enhanced learning environment. Two issues regarding technological design need to be addressed. First, availability and easy access are initial requirements for an effective web-based learning environment. An online course must be available all the time, and the access to the environment must be convenient and fast (Salmon, 2000). Research indicates that the learners who have easier access participate more frequently in online discussions than those who do not (cf. Harrison & Stephen, 1996). Second, interface design is crucial as it determines the usability of a learning environment. The interface design of an online course should focus on ease to learn, ease to use, and aesthetics (Wang & Cheung, 2003). Ease to learn is critical for beginners; ease to use becomes more critical when users gain more experience over time. The interface should be attractive in order to motivate and engage learners. In addition, the following design principles are critical for online course design.

An online course should support multimedia representation to allow various levels of learner control, interactivity, and context-rich learning environments (Hede, 2002 ; Wang & Cheung, 2003). Moreover, an interesting user-friendly interface and challenging activities of a multimedia program can motivate and engage learners (Najjar, 1998). An online course may use multimedia such as text, audio, video, and animation to present the content, complex problems, or cases / examples. In addition, various communication channels such as voice chats, and text-based online discussions can supplement each other to increase information cues and therefore enhance communication effects (cf. Moore, Burton & Myers, 2004).

An online course must provide easy navigation and adequate technical support. Learners may get lost in a web-based learning environment that contains a large number of hyperlinks. They often need navigational tools to inform where they are and how to reach their destinations. An easy-to-navigate online course should support both linear (such as back and next buttons, index) and hierarchical (such as menu, table of contents, concept map) navigation (Wang & Cheung, 2003). An online course ought to provide immediate technical support so that learners can concentrate on their learning.

Lastly, an online course should support interface customization. An example of interface customization is that the icons on the Windows XP desktop are often arranged differently on different users' computers. An online course may allow learners to customize its interface to meet their personal preferences. Some customization activities include choosing a preferred interface from a list of templates, updating users' photos, or changing the order and / or color of buttons or links.

2. EVALUATION OF THE ONLINE COURSES :

2.1 The Evaluation Question, the Samples, and the Instrument :

The general evaluation question of this study was ;- What is the quality of the online courses developed as a result of the national projects in China? Specifically, we investigated the design specifications of the online courses from the pedagogical, social, and technological dimensions.

To ensure the selected online courses were representative, two criteria were applied ;- different subjects and different universities. We chose a range of subjects for evaluation, as different subjects had different characteristics and requirements. In addition, we selected online courses from different universities as they might devote different efforts to their development of online courses.

The brief descriptions of most of the elite

online courses are shown on the web site: http://www.hyxr.com.cn/gj/wlkch/jieshao.htm . These courses are grouped into 15 subject categories such as computers, science and engineering, arts, economics and management, medicine, or law. The specific URLs of the online courses, however, are not listed on this web site. For each category, we randomly chose a course, and used the title of the course (e.g. 'The Basics of Multimedia Applications') and the name of the university (e.g. 'Dalian Maritime University') as the keywords to search the web to find the relevant URL. We managed to obtain two or three courses for each subject category. A total number of 33 courses covering all subjects were collected, which were developed by different universities.

The main instrument used in this study was a 26-item survey questionnaire, covering the pedagogical, social and technological dimensions. Twelve items were concerned with the pedagogical design, seven with the social design, and the other seven items with the technological design. Since the focus of the study was to investigate the actual specification facts of the online courses, each item was associated with one or other of only the two options - either 'yes' or 'no'. 'Yes' meant that this design specification was involved in the online course, and 'no' meant this specification was not supported.

3. THE EVALUATION RESULTS :

The percentage of the online courses having the specified item on the pedagogical dimension is shown in Table 1. The results indicate that these courses had sound pedagogical design. Nearly all courses had clear course descriptions and learning objectives. However, about one-third of the online courses did not state clearly who were the intended target users, and no courses supported flexible learning objectives. All the learning materials were presented by using hypermedia and allowed learners some control over the content. But, most hyperlinks pointed to internal web pages only without links to external pages on other web sites. Moreover, no courses enabled students to add extra materials. The majority (74.2%) of the courses included

Table 1 : The Evaluation Results of the Pedagogical Dimension

	Item	% yes
1	The online course has a clear course description	93.5
2	It clearly describes intended target learners	64.5
3	It clearly states learning objectives	87.1
4	It provides sufficient learning resources	76.7
5	The students can add further learning materials	0.0
6	The learning materials are hyperlinked	85.7
7	The learning materials are presented by using multimedia	96.6
8	It provides teachers' presentation videos	74.2
9	It enables students to reflect on the content learned	0.0
10	It allows students to practice	93.5
11	It involves online tests	80.6
12	Students can get immediate feedback after taking the practice or tests	48.4
	average	66.4

teachers' presentation videos taken in classrooms. Some even allowed students to download the videos to local computers to overcome the low-speed access problem. Most practice and test items just showed sample answers without any feedback on students' input. In addition, most courses were more likely to be research showcases, as they showed historical development of the courses and the development team members' publications and rewards on the course web sites. The results on the pedagogical dimension show that further improvement should be given to i) flexible learning objectives; ii) clear learner descriptions; iii) extra learning materials; and iv) immediate feedback.

The results on the social dimension (Table 2) imply that the social design of the online courses needs to be enhanced. Most of the courses did not support synchronous forms of online discussions. More than half of the courses did not support asynchronous online discussions either. Nearly half (48.4%) of the courses enabled students to post questions online. However, only few courses (25.8%) showed teachers' responses and none of the courses supported group collaboration. Some other features with respect to social design were also noted. One course showed students' comments on the course design, but these comments were described by the course design team. It seems that students might not be able to post comments directly. In addition, six messages were listed in the FAQ forum. It is most likely that these messages were posted by the designer team to test the function of the forum. Another course enabled students to post questions. However, students could not view questions and responses posted.

Table 3 shows the results on the technological dimension for the online courses. All the courses supported fast Internet access. Video clips or animations in some courses, however, could not be downloaded or played quickly. Most courses were easy to navigate. They had navigational tools such as buttons, pull-down menus, table of contents, or concept maps. Most courses (83.9%) showed locations to help users identify where they were. More than half (61.3%) of the online courses show clearly contact information (i.e. email addresses or phone numbers) of course designers or technicians. Moreover, most of the online courses were rather reliable and error free. But some errors happened during the evaluation processes. No course enabled learners to customize its interface. Some courses had inconsistent interface design. For instance, different components (such as content and practice) of a course were represented in different styles with different navigational tools or fonts. It seems that these components were developed by different groups without any

Table 2 : The Evaluation Results of the Social Dimension

	Item	% yes
13	It supports synchronous online discussions	12.9
14	It supports asynchronous online discussions	41.9
15	It enables students to send messages to peers or the teacher	22.6
16	It enables students to ask questions online	48.4
17	It supports group online collaborative learning	0.0
18	Students can obtain responses from the teacher	25.8
19	It can trace individual learning processes	9.7
	average	23.1

Table 3 : The Evaluation Results of the Technological Dimension

	Item	% yes
20	It supports fast Internet access	100.0
21	It involves multimedia presentation	100.0
22	It is easy to browse and use	83.9
23	It provides means for technical support	61.3
24	It allows students to customize interface design	0.0
25	It is error free	71.0
26	The interface design is attractive	45.2
	average	65.9

coordination. Another online course adopted the book metaphor by showing a table of contents with a book layout. Clicking on a chapter led to its sections. Clicking on a section, however, opened a normal web page that was completely irrelevant to the book metaphor.

4. DISCUSSION :

The purpose of this study was to examine the quality of the online courses from three design dimensions: pedagogical, social, and technological. This concluding section will discuss some issues involved in this study.

Educators commonly agree that pedagogical design is critical for computer-based courses. A simple placement of hardware and software will not make information and communication technology (ICT) integration and effective learning naturally follow (Earle, 2002). The primary factor that influences the effectiveness of learning is pedagogical design (cf. Mandell, Sorge & Russell, 2002). The results of this study indicate that much design effort of the online courses was put into certain aspects of pedagogical design such as content organization and content delivery. However, insufficient effort was devoted to other pedagogical aspects, such as negotiable learning objectives. This result is consistent with other research findings reported by Liang & Jiao (2002) and by Lin & Yu (2002).

Social constructivism claims that knowledge is collaboratively constructed in a social-cultural context. The results of this study reveal that social design is scarce in these online courses. Very few courses allowed learners to post questions or comments to the course web sites, and students could not share ideas and negotiate solutions either. This result indicates that the importance of social design has not yet been fully realized. This study suggests that more social design effort should be involved in online course development.

The technological dimension is the initial requirement for construction of an effective online course as most learning activities are conducted through the support of the technology. The results of this study show that technological issues of the online courses had been carefully designed and integrated. However, some aspects need to be improved. For instance, it is preferable that online courses can provide immediate technical support and allow learners to customize the interface.

The results of this study suggest several areas of online course design can be further improved. First, the social design aspect should be further enhanced. Online learning has the advantage of flexibility in terms of time and place. However, online learning also has the shortage of lacking social presence and interactivity compared to traditional classroom instruction (cf. Moallem, 2003). The rapid development of computer mediated communication (CMC)

has made social interaction and collaboration more feasible through the Internet. Online courses should incorporate more communicative and interactive tools such as online discussions, chats, and video-conferencing.

Second, online course development should combine the support of learning management systems. Most learning management systems such as Blackboard and WebCT have the functional capability for online discussions, video-conferencing, virtual classrooms, and group pages. These functions, however, were inadequate in these online courses. The combination of learning management systems and online courses would make the development of online courses simpler and also the developed online courses more interactive.

This study reports the evaluation results of a set of online courses developed in China. Although this study focused on the context of only China, these design dimensions (pedagogical, social and technological) are also helpful for online course development and evaluation in other contexts as well. Hopefully the findings of this study can also benefit online course development in a broader scope.

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