



## CHAPTER TWENTY-ONE

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# DESIGNING BLENDED LEARNING FOCUSED ON KNOWLEDGE CATEGORY AND LEARNING ACTIVITIES

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## Case Studies from Beijing Normal University

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With the fast-growing economy and changing society in China, there has been large-scale development of both regular higher education and distance education in recent years. But we also have to face the challenges of inferior schools, lack of teachers, and lack of understanding about instructional theory and methods. Following world trends, many universities and colleges in China have carried out numerous experiments with e-learning but have not achieved the expected results.

This chapter puts forward a module of curriculum design based on blended learning while summarizing our research and practice in this area during the past several years, which aims at integrating the advantages of traditional instruction and e-learning as well as overcoming their disadvantages. The module, which considers the learner, the learning objectives, the design of learning resources and activities, the delivery methods, and associated assessment techniques, has demonstrated its viability in designing blended learning. In the end, this chapter gives two practical cases that use this blended learning model: one related to curriculum resource development and the other to the instructional implementation of curriculum.

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### Needs of Blended Learning

Since 1998, four universities in China have been engaged in network education experiments under the approval of Ministry of Education (MOE). In expanding these efforts, at the end of 2003, sixty-four additional universities established their

own special School of Network Education (SNE). It mainly uses e-learning instead of delivering instruction via correspondence or broadcasting (Huang, Zhang, & Dong, 2003). The sixty-eight SNEs, have approximately 2 million registered students and 13,540 teachers distributed in about 2,790 learning centers. Interestingly, many SNEs once recruited full-time students and issued the same diplomas as their counterparts in ordinary universities. This situation resulted in censure from MOE. Thus, according to official views, e-learning cannot be used as a substitute for classroom teaching. As a result, the SNEs are now limited to continuing and adult education.

Actually, there are very few instructional institutes that use only e-learning for instruction. Although some schools claim that they use e-learning as their main teaching method, most university learning centers undertake many methods in traditional instruction, such as the use of tutorships. Moreover, many other instructional institutions within China offer e-learning in combination with traditional distance education. So an enormous framework of blended learning has been set up in various certificate education and in-service training programs in China.

In traditional universities and colleges, many external factors help people realize the value of blended learning, thereby facilitating its effectiveness and wide use in teaching practices. First, university and college enrollments in China have jumped quickly: the number of students increased at a rate of over 20 percent annually between 1999 and 2002. In 2000, college and universities enrollments increased by one-third or more (see Table 21.1). These sharp increases put a strain on educational resources and highlighted the dearth of classrooms and experienced teachers. These resource constraints forced many universities and colleges to expand beyond traditional classroom instructional methods. Second, due to the SARS epidemic in China, especially in Beijing in the first half of 2003, personal movement and communication were badly interrupted; even normal face-to-face communication was considered dangerous. Therefore, when normal classroom instruction was halted, the idea of e-learning became popular since it could achieve similar objectives without face-to-face communication. During the SARS epidemic, over one-third of the students of Beijing Normal University (BNU) left Beijing; the percentage was higher at other universities. During this period, most universities tried to tutor their students through correspondence and e-learning.

As a result of these events and trends, the introduction of the concept and method of blended learning was a natural start for the application of e-learning in regular university instruction. Not only do more people realize the value of blended learning in university environments, but they also now realize that it offers a way to continue instructional activities when emergencies or disasters interfere with regular instruction. Therefore, we expect that blended learning will continue to develop

**TABLE 21.1. NUMBER OF COLLEGE STUDENTS  
IN CHINA, 1998–2003.**

Year	Number of College Students (million)	Percentage of Annual Increase
1998	3.409	7.4
1999	4.134	21.27
2000	5.561	34.52
2001	7.191	29.31
2002	9.034	25.63
2003	11.736	16.6

*Note:* B-learning = blended learning.

*Source:* Based on statistics from the National Statistics Bureau, excluding graduate students. Available at [http://www/stats.gov.cn/tjsj/ndsj/index.htm](http://www.stats.gov.cn/tjsj/ndsj/index.htm).

in universities and colleges in China over the next few years. But one problem is that the institutions and staff involved in network education as well as traditional universities lack the appropriate knowledge for developing correspondence methods of instruction and also the organization to take full advantage of blended learning. Four factors are important to the quality of education when using blended learning methods: (1) the curriculum, (2) organization of learning activities, (3) learning support, and (4) instructional evaluation (Huang, Zhang, & Dong, 2003). How to deal effectively with those four issues is one of this chapter's focuses.

There are various ways of delivering instruction, from traditional classroom instruction to the complete implementation of e-learning. And there are many different forms of blended learning, most of which combine e-learning and regular classroom learning. There is tremendous diversity in the instructional organization and implementation of blended learning, which makes its design extremely difficult. Clearly, blended learning cannot be regarded simply as a type of technology-intensive activity that replaces the functions of classroom instruction. Instead, those effectively incorporating blended learning must think about how it might enhance, extend, or transform the classroom learning experience, not simply replace it.

## Challenges Faced in Implementing Blended Learning

This section addresses three challenges to implementing blended learning: designing the curriculum, designing and using online resources, and changing the strategies students use to learn.

## How to Design the Curriculum of Blended Learning

Blended learning adjusts to the essential learning methods and overall learning environment, but teachers lack the necessary theoretical preparation and experiential experience to take full advantage of these changes. In fact, the main challenge in blended learning is that most instructors in higher education do not know enough about effective instructional activities based on blended learning. In China, for example, instructional activities in a traditional university are not well suited to students who prefer self-paced and self-regulated learning.

The urgent issue of carrying out blended learning is to put forward a series of curriculum design methods and ideas concerning blended learning that teachers can easily use. The module promoted in this chapter is intended to help teachers design blended learning.

## How to Design and Use Online Resources

The styles and organizing methods of learning resources in blended learning, the second factor important to the quality of blended learning, involve many types of media and instructional designs unlike the resources of e-learning, which are more independent and stable. Blended learning resources need to be integrated with learning activities (especially in normal classrooms) and embedded into online curriculum resources. Therefore, the flexibility of blended learning not only provides more choices for knowledge delivery and skill development, but it simultaneously makes resource development more difficult. The design of blended learning resources should be considered within the overall design of the curriculum in order to adjust to the vast new resources and activities of e-learning and classroom learning.

## Changes in Student Learning Strategies

The third challenge of quality blended learning relates to getting students to adopt or use learning strategies that are different from what they are used to in the traditional didactic, lecture-based classroom. College students in China have been receiving classroom instruction training using typical drill-and-practice models, forcing them to overrely on the requirements and demands of teachers (Robinson, 1999). Using the Learning and Study Skills Inventory (LASSI) (Weinstein & Palmer, 1987), we surveyed students' learning strategies in BNU. As in other universities, the level of students' learning and study strategies was not high. In fact, American student scores exceeded those obtained by Chinese students, especially on motivation and attitudes (Huang & Zhou, 2003). These findings begin to explain why, in technology-rich environments, Chinese students are often slow to take advantage of Web-based learning methods and often fail to develop the learning skills that match this instructional approach (Zhou & Zhang, 2001).

Moreover, blended learning requires that students change learning environments frequently, which may cause confusion regarding the learning objectives and make students unable to select and use proper cognitive activities. Such confusion will eventually make it difficult for students to form a stable and effective learning approach or strategy. In regular instructional situations, students' learning activities can be adjusted with the help of their teachers' external control and advice. But in blended learning, there is more reliance on student metacognition and self-directed learning, exactly the type of skill base that is often lacking among most Chinese students (Huang & Zhou, 2003). Hence, teachers and instructional designers must consider how to promote students' self-regulated learning capability in the process of instructional design.

In blended learning, the representation, delivery, and transaction of knowledge are altered somewhat, so it is important to consider the theoretical framework and instructional implementation of blended learning in universities and colleges. Many of the problems that Chinese universities encounter with blended learning likely exist in other parts of the world. In addition, these problems are closely related to one another.

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## Designing Blended Learning

In China, any new educational delivery approach or method needs to be easy to follow for instructors and not be too different from their usual way of doing things. This is especially true when implementing blended learning since it is still new to our teaching staff and students. The four key challenges can also cause students to get confused or lost. In the next section, we put forward instructional design procedures suitable to the requirements of blended learning.

From the perspective of pedagogy, teaching and learning in a blended learning environment can be highly unstable and fluctuating. Consequently, the organization and instructional methods of each curriculum program, course, or module are different. Indeed, blended learning does not yet have a specific instructional design plan or framework that can be used for all curricula.

### Theoretical Considerations for Design

Many well-known models of instructional design usually correspond to classroom instructional settings, which fail to meet the requirements of blended learning. We regard blended learning as the integration of e-learning and classroom learning. As a result, there is a pressing need to consider many instructional design questions and issues, such as those related to time distribution, the design of online

as well as classroom activities, the relationship between resources and different learning modes, and the balance point of e-learning and classroom learning. Clearly, with all these factors to consider, as well as the recent emergence of this approach, blended learning needs a theoretical framework or model to support it.

In his instructional design approach, *The Conditions of Learning and Theory of Instruction*, Gagné (1999) promotes the idea of “providing different instruction for different learning outcomes” (p. 302). In effect, there should be a close relationship between learners’ internal mental processes and external instructional activities. Combining this idea with Anderson’s idea of knowledge categories, Chinese scholars Shao and Pi and others put forward the idea of “knowledge category and objective-oriented instruction” and set up the “instructional process module of pan-knowledge” (Pi, 1998), which provides a sound basis for designing instructional activities and events suitable for e-learning and classroom learning. They argue that a teacher should design different learning and teaching activities for different types of knowledge and set out practical methods to design learning and teaching activities.

In order to confirm the relation between learning activities and types of knowledge, we use Bloom’s taxonomy of educational objectives as revised by Anderson and Krathwohl (2001). Using this taxonomy, we can determine what type of delivery method is suitable to the content: online or classroom learning. The technique should be employed according to one’s knowledge of the advantages as well as the disadvantages of e-learning and ordinary classroom learning. We believe that attempts to list such activities and methods will be highly similar to the second-generation instructional design (ID2) proposed by Merrill and his colleagues (Merrill, Li, & Jones, 1990). According to ID2, learning results from a given organized and elaborated cognitive structure, and different learning outcomes require different types of mental models. However, the learner’s construction of a mental model is facilitated by instruction that explicitly organizes and elaborates the knowledge being taught during the instruction. The difference is that Merrill and his colleagues’ instructional design environment was based on multimedia environments, whereas we are concerned with network environments.

As a knowledge construction process with learner intention and self-consciousness, learning activities need the support of reflection and self-regulated learning (Jonassen & Land, 2000). Blended learning requires that students have the consciousness and capability for self-regulated learning. As Zimmerman (2002) points out, the basic components of self-regulated learning are planning, monitoring, and reflection. The learning activities listed in Table 21.2 are in accordance with traits of self-regulated learning and embedded in various Web-based activities. Integrating the metacognitive knowledge with the other types of knowledge will help foster the successful implementation of blended learning.

**TABLE 21.2. BIDIMENSIONAL TAXONOMY OF EDUCATIONAL OBJECTIVES AND ACTIVITY DESIGN.**

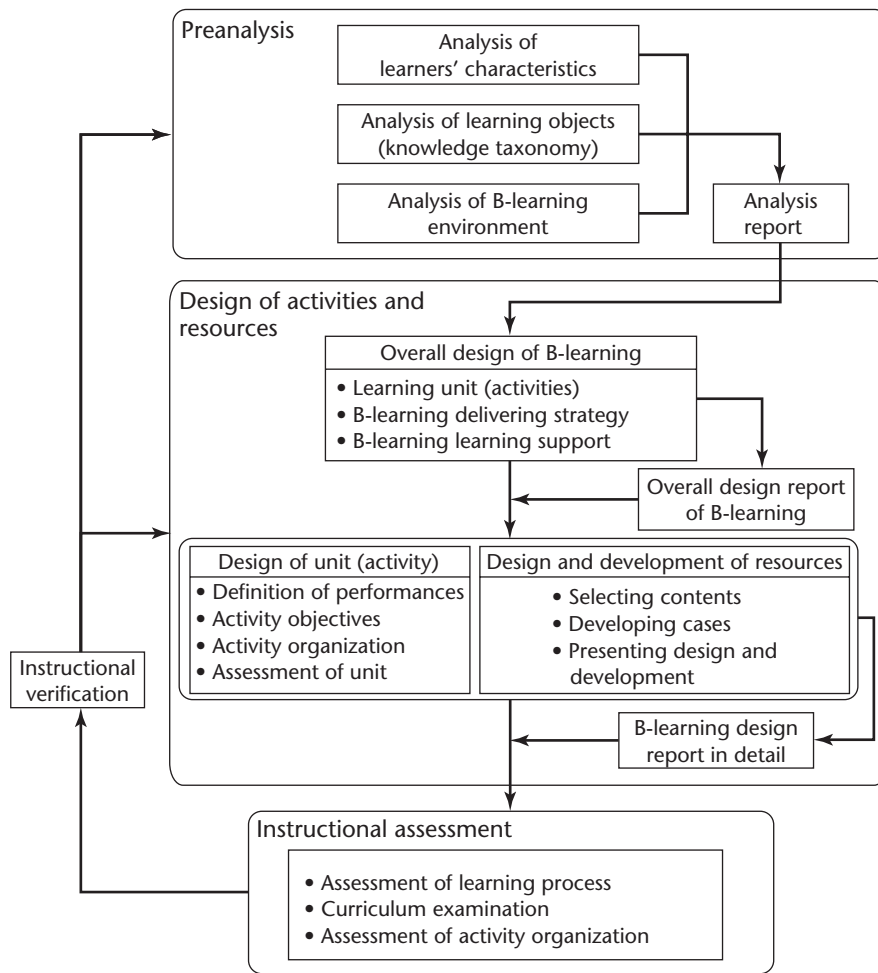
Knowledge Dimension	Cognitive Process Dimension					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
<b>A. Factual knowledge</b>	Reading (textbooks and online hypertexts)	Tests; Search on Internet				
<b>B. Conceptual knowledge</b>		Concept maps	Online tests			
<b>C. Procedural knowledge</b>		Discussion; Communication; Concept mappings; Online collaboration	Practice; Resolve well-structured problems	Case studies	Reflection	Resolve ill-structured problems
<b>D. Meta-cognitive knowledge</b>		Communication; brainstorming	Making up learning strategy	Activity record study	Reflection	

### Design Procedures for Blended Learning

Blended learning should be designed carefully. The procedures shown in Figure 21.1 are intended to clarify how to design blended learning. The procedures have three main stages: (1) preanalysis, (2) activity and resource design, and (3) instructional assessment. Of course, instructional implementation is the ultimate objective of any instructional design model or viewpoint, including those related to blended learning.

**Preanalysis.** In order to ascertain whether blended learning could be used, several observations and analyses need to be conducted. These analyses mainly consist of three factors: (1) regular assessment of learners' prior knowledge, learning styles, and strategies; (2) content analysis of the curriculum according to the criteria of Table 21.2; and (3) environmental features analysis. Here, the learning activities and organizing methods should be clearly spelled out and defined, thereby enabling the creation of an initial analysis report.

**Activity and Resource Design.** This stage consists of three substages (see Figure 21.1). A detailed design report in the second stage should be emphasized; it is the basic document for blended learning and focuses on teachers' instructional

**FIGURE 21.1. DESIGN PROCEDURES FOR BLENDED LEARNING.**

methods for organizing course events and activities and also the basic principles for curriculum assessment. The most important difference from ordinary instructional design is that it focuses on which activities and resources fit the e-learning context and which fit the typical classroom context.

**Instructional Assessment Design.** The assessment design depends on the activity objectives, performance definitions, and the general environment of blended



learning. It chiefly uses the assessment of the learning process (for example, using e-portfolios), the examination of curriculum knowledge (for example, online tests), and the organization of learning activities.

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### **Case One: “Introduction to Educational Technology,” an Online Course**

“Introduction to Educational Technology” is a course in the master’s degree program in education for English teachers in the SNE within BNU. It is a typical blended learning curriculum, but uniquely developed through the cooperation of Chinese and British colleagues as funded by the two governments. The project started in May 2003, and was completed in May 2005.

#### **Preanalysis**

“Introduction to Educational Technology” is designed for in-service teachers to take from home. Not only is e-learning a suitable way for them to get credit hours, but this course exemplifies the integration of theory and practice since these teachers are learning much subtle and tacit knowledge about how to deliver course information and learning activities using the Internet. Given the lack of teacher knowledge or experience in this area and the need for modeling and sharing ideas, an appropriate amount of face-to-face instruction is needed in this case.

The course consists of seven relatively independent modules: (1) overview of educational technology, (2) integration of information technology into the curriculum, (3) instructional media, (4) instructional resources, (5) instructional design, (6) Web-based learning methods, and (7) a conclusion of the curriculum with an emphasis on teachers’ professional development. The curriculum aims to foster teachers’ capability of using educational technology effectively to achieve better results of classroom instruction and promote teachers’ professional development and reflection.

The curriculum implementation and main learning activities will be put into a Web-based platform. The basic learning modes include case studies, discussion of key themes, and group learning. The group learning is crucial since it will help learners share their experiences and feelings, develop skills for analyzing and solving problems, and make better decisions about strategies for using technology and fostering better instructional design. Learners can constantly improve their understanding in course concepts using discussion and communication, thereby equipping them with a better understanding of theory and method and how to put them into practice.

Learners of the curriculum come from K-12 schools. They need to take a 144-hour course over eighteen weeks while they are still teaching in their respective schools.

## Activity and Resource Design

This course uses a Web-based curriculum. Since the curriculum uses blended learning methods, it embeds a plethora of resources and activities. The actual curriculum involves all kinds of resources that are organized according to the activities reflected in Table 2.2. As such, this organizational framework provides the basis for the overall design of the curriculum. At the start of the course, a lead-in activity introduces the course content, learning objectives, learning methods, assessment methods, and even the appropriate navigational methods.

A typical unit example is shown in Table 21.3. This example is the basic frame of activities and resource design for the unit on instructional design. It is obvious that the curriculum needs the support of a powerful blended learning support system, so that different types of roles or activities can enhance student interaction and meet the stated learning outcomes. Most activities listed in Table 21.3 will be performed using a learning management system. But at the end of every

**TABLE 21.3. BASIC DESIGN FRAMEWORK OF THE INSTRUCTIONAL DESIGN MODULE.**

Learning Objectives	Students' Activities	Resources	Teachers' Activities
1. To understand the basic concepts of instructional design.	Mostly reading	Articles, video (lectures given by experts, recommended Web sites)	Answering questions online, videoconferencing
2. To get familiar with the process of instructional design			
3. To design instructional case of the learners' own subjects	Reading, problem solution (practice and implementation of instructional design), discussion and communication (the process of submission and the record of reflection)	Articles, cases (video and articles)	Tracking the design and implementation process of cases, offer advice and feedback, face-to-face discussion
4. To master the assessment methods for instructional design cases	Discussion and communication (analyze cases in groups), case analyses (submission of group reports)	Case studies (video), article cases (description of lesson plans)	

activity, a face-to-face session will be held. Thus, the tutors can see their students' authentic progress and discuss the content and procedures with them.

In the design process, the curriculum refers to the requirements of curriculum content design and the learning management system (LMS) as detailed in the Sharable Content Object Reference Model (SCORM) developed at the Advanced Distributed Learning Lab (2003).

### Assessment Design

The evaluation of the curriculum uses formative assessment in exploring specific records of learning process including learner e-portfolios and computer log data.

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## Case Two: "Multimedia Technology," On-Campus Curriculum

This case relates to an instructional reform program at BNU, "Multimedia Technology," a required course for junior undergraduate students majoring in computer science. One of us was involved in creating this course as part of a master's program in the early 1990s.

### Preanalysis

"Multimedia Technology" was built on a practical curriculum with many concepts concerning broad fields and fast-emerging technologies. Therefore, the curriculum not only stresses basic concepts and theories but also targets students' learning skills and metacognitive strategies. The aims are to enable students to learn actively and obtain new multimedia technology skills and experiences as well as to develop an understanding of the basic principles of multimedia. The curriculum includes various types of knowledge and different levels of learning activities.

This eighteen-week course typically has about 120 junior undergraduate students, one lecturer, and two tutors. These students have already taken other computer courses. As a result, they have enough knowledge and skill preparation for learning multimedia technology. However, they still lack a personal understanding of relevant learning strategies and self-regulated learning (Huang & Zhou, 2003). They are also accustomed to face-to-face lectures in traditional classrooms instead of cooperative learning and complex curriculum-projects.

In response, the major group collaboration project was guided regularly by tutors through a network learning environment, WebCL (Web-based Cooperative

Learning System), which was developed at BNU. Except for the textbooks, we also developed most of the other relevant e-learning resources and provided reference Web sites and bibliographies. (WebCL is a management platform based on cooperative learning developed by the Research Center of Knowledge Engineering, BNU. It provides a learning space for each group, including discussion areas, resource management, online chat, group work, online testing, and various tools for communication and exchanges.)

### Activity Design

The course uses task-driven group learning to organize activity units in a blended learning format, including seven weeks of classroom instruction and eleven weeks of e-learning. There are four main types of activities: the lead-in activity, classroom lecture activity, e-learning activity, and curriculum-level project-based learning (PBL) activity.

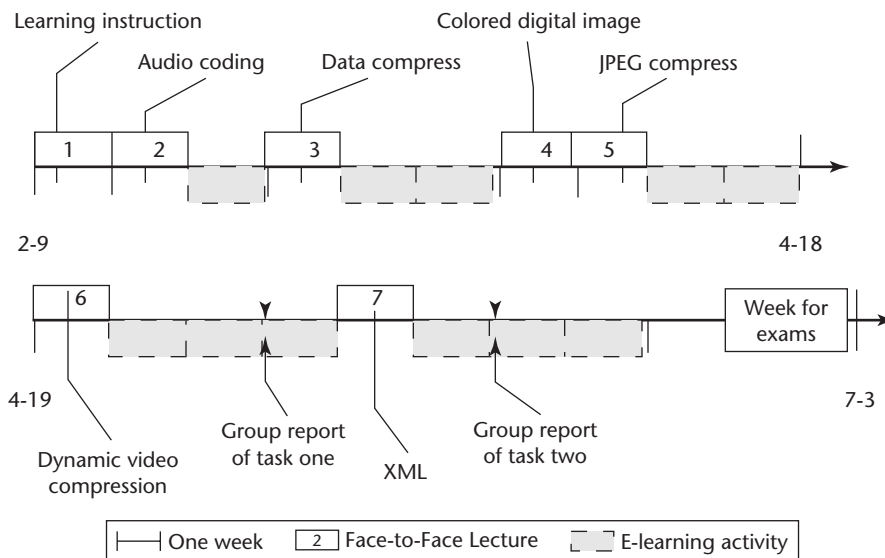
A lead-in activity uses face-to-face instruction such as a typical classroom lecture activity. Afterward, the tutor and students kept in contact with each other through the WebCL. In general, their online correspondence has dealt with the learning method and fundamental knowledge. The e-learning activity includes online discussion, case studies, online debates, online testing, and individual concept mapping. The course has two key PBL activities, designing a multimedia player and developing an XML-based Web site, which are completed by collaborative groups during off-line class time. All activities were generated according to the principles detailed above and assigned to either the face-to-face or e-learning delivery methods. The instructional process of the curriculum and organization of the basic activity units are shown in Figure 21.2.

Learning activities at both the unit and curriculum levels contain objectives, definition of performance, and organization and evaluation. The students can check their own learning process records as well as that of their groups on WebCL at any time, and evaluate their learning through reflection. Using this system, the chief lecturer and tutors can communicate with the students individually and in groups through bulletin board systems, e-mail, and instant messaging. In addition, instructors can obtain instant assessment and feedback regarding the performances of each student and each group.

### Evaluation

At the end of this curriculum, we interviewed a few group leaders and their members to learn how they viewed blended learning. In general, the students thought that the blended learning activities offered them a full range of learning

**FIGURE 21.2. SEQUENCE OF ACTIVITIES  
IN "MULTIMEDIA TECHNOLOGY".**



opportunities and resources that better matched reality. Most students were favorable toward combining network-based and classroom instructional techniques. In addition, they felt that with help from their tutors regarding how to collaborate online, they can learn how to communicate and collaborate with others to complete learning tasks more effectively. These interviews indicated that the online learning resources provided by the platform helped push highly motivated students to expand their knowledge and dig deeper in an area. The formative assessment of student e-portfolios helped reduce the all-too-common goal of simply learning for exams, so students could truly devote themselves to learning. This was an important finding, especially for Chinese students, who tend to overly focus on scoring high on exams and final grades.

## Conclusions

Blended learning is having a significant impact on learning in higher education settings in China. It has not only changed traditional instructional approaches but also reduced the pressure brought about by the lack of instructional equipment and experienced teachers. However, blended learning is not a new instructional

method in China. In fact, with the growth of Chinese universities and social needs brought on by the SARS epidemic, it has existed for three years. But from a systemic view of blended learning design, there is a new and highly unique significance from an encompassing model or design procedure for blended learning because it has many new challenges as well as opportunities.

The two cases in the chapter reflect the conditions of blended learning in China. The procedures are also feasible and can suit different kinds of blended-learning courses. To determine learner adaptations to blended learning, we interviewed students after they finished the “Multimedia Technology” course. They perceived that the activities in the course changed the typical flat instructional method of higher education and gave them more resources and personal choices. They also claimed that the WebCL tool played an important role in their learning process because it provided an effective way to cooperate and communicate. Such results imply that it is vital to select an appropriate learning management system for blended learning. Nevertheless, students are not accustomed to learning without their teacher at their side, causing them to spend more time attempting to understand given contents than in traditional classes. Given these findings, there is a pressing need to explore more effective interactive avenues between online tutors and students.

As we close this chapter, we would like to point out that e-portfolios can play special roles in blended learning settings. First, they can motivate students and help them to shake off their rooted notions of learning for the test. This change has special meaning in the Chinese educational system, which is rooted in teachers’ telling and students’ responding on exams. Second, e-portfolios might eventually be charged with the role of individual knowledge management so that they can serve as a basis for students to monitor, manage, and reflect on their performance (Zimmerman, 2002). We find this approach is more beneficial to the two PBL activities of our “Multimedia Technology” course. While these activities may need greater emphasis on self-regulated learning, e-portfolios can facilitate movement in that direction. We think the use of e-portfolios is necessary in blended learning, which we believe is superior to other learning approaches in higher education.

## References

- Advanced Distributed Learning. (2004). *Sharable Content Object Reference Model*. Available <http://www.adlnet.org/>.
- Anderson, W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's educational objectives*. White Plains, NY: Longman.
- Gagné, R. M. (1999). *The conditions of learning and theory of instruction* (4th ed.). Shanghai: East China Normal University Press.

- Huang, R. H., Zhang, J. B., & Dong, Y. (2003). On the four key parts of Web-based instructional course. *Chinese E-Education*, 192(1), 61–64, 193(2), 66–68.
- Huang, R. H., Zhang, Y., & Zhang, J. B. (2003). On-line learning activities design for college students based on learning strategies——instruction case of the course “Multimedia Technology.” *Research of E-Education*, 124(8), 25–29.
- Huang, R. H., & Zhou, Y. L. (2003). Analysis on distance learning characteristics. *Chinese E-Education*, 194(3), 75–79, 195(4), 69–71.
- Jonassen, D. H., & Land S. M. (Eds.). (2000). *Theoretical foundations of learning environments*. Mahwah, NJ: Erlbaum.
- Merrill, M. D., Li, Z., & Jones, M. K. (1991). Second generation instructional design (ID2). *Educational Technology*, 30(2), 7–14.
- Pi, L. S. (Ed.). (1998). *Knowledge category and objective instruction: Theory and practice*. Shanghai: East China Normal University Press.
- Robinson, B. (1999). Asian learners, Western models: Discontinuities and issues for distance educators (L. S. Li, trans.). *China Distance Education*, 2, 17–19.
- Weinstein, C. E., & Palmer, D. R. (2003). *Users manual for those administering the Learning and Study Strategies Inventory* (2nd ed.). Retrieved May 24, 2003, from [http://www.hhpublishing.com/\\_assessments/LASSI/index.html](http://www.hhpublishing.com/_assessments/LASSI/index.html).
- Zhou, Y. L., & Zhang, J. P. (2001). Internet-based learning traits and instructional design. In *Proceedings of the IEEE International Conference on Systems, Man and Cybernetics* (Vol. 1, pp. 459–463). Piscataway, NJ: IEEE.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64–71.



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