Blended Learning Applying in University Education[*]

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Abstract. This paper introduces different scholars' point views about blended learning and four famous application modes of it. Then, information channels and six parts of blended learning implementation are described separately. At last, the paper mainly presents a blended learning mode focusing on face-to-face learning, which has been applied in university education.

Keywords: blended learning, university education, face-to-face learning, mode

1. Introduction

With the rapid development of Internet and daily life, more and more universities change their traditional teaching mode into blended learning, which can economize time and improve efficiency. Blended learning mode is still focusing on face-to-face learning, but it comprises more elements that have advantages over traditional teaching mode.

There are signs of a more mature view of blended learning emerging that moves beyond the boundaries of traditional training and course. Certainly this will take us into performance support and knowledge management, but we must go further, bleeding e-learning into corporate communications, workplace learning, searches on the web and the real world. [1]

Nowadays, most universities adopt traditional face-to-face learning mode. It is obvious to discover its strongpoint that is convenient for both teachers and students to intercourse emotion, which would promote the process of learning. But traditional learning also exist disadvantages that can be redeemed by blended learning. Blended learning is a new trend in learning and teaching field and it is accepted by more and more scholastics.

2. Viewpoint and definition of blended learning

Margaret Driscoll thinks blended learning should contain the following four aspects: firstly, it combines different network technologies to obtain educational object. Secondly, it combines many educational methods to bring the best learning production. Thirdly, it can combine any teaching technology with face-to-face learning. Fourthly, it combines teaching technology with practice to make learning and working more harmonious.

Harvey Singh and Chris Read consider that blended learning is matching a befitting teaching technology with a befitting personal learning style, to transfer a suitable skill to a suitable person at suitable time. [2]

Many domestic scholastics agree that blended learning is from e-learning. It combines Face-to-Face learning with On-line learning properly, self-paced learning, collaborated-learning with research learning properly, accept learning with discover learning properly.

We synthesize the above standpoints from different scholastics and get a conclusion more precise as follows: blended learning is the term used to describe learning or training events or activates where e-learning, in its various forms, is combined with more traditional forms of training such as "classroom" training.

3. Application models of blended learning

Nowadays, there are four application models in the field of blended learning: Skill-Driven Model, Attitude-Driven Model, Competency-Driven Model and Barnum and Paarmann model. [3]

Skill-Driven Model：it means that self-paced learning link to the teacher's conduction on line. Most students and teachers think direction from teachers is very helpful when students are learning by themselves. Learning specific knowledge and skills requires regular feedback and support from the trainer, facilitator or peer. In this model, students can communicate with teachers by E-mails and BBS, which would reduce the alone feeling of learners and promote them to accomplish the learning aim. And teachers can also create virtual community to deal with problems that students may meet during their learning.

Attitude-Driven Model：it means that traditional classroom learning link to collaborated learning on line. Content that deals with developing new attitudes and behaviors requires peer-to-peer interaction and a risk-free environment. In this model, it is told to learners something about the learning content, attribute and expectant result through network. Students are asked to try to learn something new by cooperating with other learners on line in a comfortable circumstance.

Competency-Driven Model：it means that learners and experts both act on line at the same time. Learners observe what experts do and communicate with them what they don't understand well. During the action and communication, learners get tacit knowledge from experts on the job. Tacit knowledge, which is accumulated in the experience, is not easy to transfer. So it is the fittest learning model for students to obtain tacit knowledge.

Barnum and Paarmann Model: this model contains four parts, which are transfers based on Web, face-to-face process, forming a certain production and collaboration extension learning. And it is proved that Barnum and Paarmann Model is the most suitable model to teach by correspondence. These four parts will be described in detail as follows.

Transfers based on Web: learning information is set on Web, so students can look through the information when they need. There is also contact information about teachers on website. Students can communicate with teachers when they meet problems or they want to research further in the field.

Face-to-face process: though the information on Web is very rich and is convenient for learners to gain, the face-to-face communication between each other is also necessary. It would help learners to understand knowledge more deeply and it is a process of constructing knowledge.

Forming a certain production: only constructing knowledge is not enough for students, and they should create some tangible production while sharing the knowledge. Firstly, students should write down something about schoolwork and exercise, and send first draft to teachers and partners to find whether it has something wrong. Secondly, students finish schoolwork to present to teachers and other participators, and receive feedback and estimate from them. At last, learners complete the final draft and submit it on website.

Collaboration extension learning: students can join in some groups voluntarily. Usually, there are three or four learners in one group and they keep in touch with each other to share everyone's learning experience, information and resource by e-mail or network community.

4. Information channels of blended learning

The basic idea of blended learning is to emphasize the dominant role of teachers and the principal role of students, which is also called "double importance" model. Its essence is to research the channels of information transfer.

The representative information channels are mostly classroom, virtual classroom, courses based on Web, presswork, CD, E-mail, telephone, video, coach and tutor, EPSS (electronic performance support system), software simulation, and cooperation on-line. But the hotspot in blended field is information transfer channels in learning process, not the technology of transfer channels.

Face-to-face learning and on-line learning are two basic channels for blended learning. And in the face-to-face learning mode, there are formal learning and informal learning, based on technology and based on participator, based on directing and based on discovering in activities. We can rank all the above contents as the following tabulation. [4]

There's no cookbook for blends. Blending should rivet attention on how to combine resources to achieve a strategic purpose. Therefore, staying focused on a good blended learning mode is crucial to blending success.

Table 1. Channels for blended learning

Real-time Face-to-face learning (formal):	Real-time Face-to-face learning (informal):
• direction from teachers in class • proseminar • coach and tutor • workshops	• working team • role mode • relation among students
Virtual cooperation (synchronization)	**Virtual cooperation (asynchrony)**
• electronic tutor • e-learning mode	• BBS • e-mail • community on line • mail list
Self-paced learning	**Performance support system**
• on Web learning • resource connection on line • games based on scene • video, CD, DVD, • self-testing on line	• help system • knowledge base • document • printer working assistant • tools of supporting performance and decision-making

5. Blended learning mode implementation

There are mainly six parts in blended learning: instructor-lead learning, self-paced learning, collaborated-learning, knowledge management, performance support and assessment. We can describe this model as Figure 1.

Instructor-lead: this is a traditional teaching form. It is unnecessary for students to discover or discuss some knowledge which can be presented by teachers directly. This kind of knowledge is told by teachers in a short time to achieve the learning aim. And communication between teachers and students can promote the emotion, which plays an important role in learning process. There are four elements in this part to create an engaging, effective live learning experience. [5]

• Attention: the first element is to gain and keep the learner's attention. For example, an experienced virtual classroom instructor may begin his class by telling a joke, or by polling the learners with a thought-provoking question. This engages online learners and prepares them for learning.
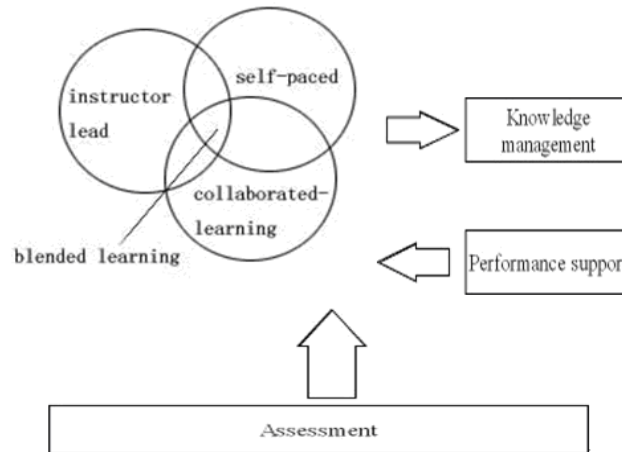
Fig. 1. Components of blended learning

- Relevance: learners stay focused when they believe the training is relevant to their specific situation. A virtual instructor may show how learners can use course information to solve real problems. To show relevance she may also use examples or analogies familiar to her audience.
- Confidence: learners must have confidence in their skills and abilities in order to remain motivated. To instill confidence in learners, an expert virtual instructor will make classroom expectations clear, and then give learners enough time to practice their new skills.
- Satisfaction: finally, learners must be satisfied with the results of their learning experiences in order to remain motivated. A good virtual instructor will do this by providing learners with opportunities to use new skills, such as having them perform hands-on exercises that simulate their work environment.

Self-paced: students can choose learning content, method and approach in rich learning resource. For example, students can learn using on line Web or books from library, and E-journals are also a good choice for those who are not available to Internet. Students can learn at any time and any place with this learning form.

Collaborated-learning: it contains two parts: collaboration between teachers and students and collaboration between students and students. During the cooperation, students would cultivate team cooperation spirit, which is useful in the future life. Usually, there are four modes about collaborated-learning: competition, cooperation, associate and role playing.

- Competition is that two or more than two learners study the same content by Internet completely. One who meets the teaching demand wins. Students can adjust learning strategy due to their state.
- Cooperation means that several learners finish one learning task together. Each one in team should try their best and help each other. Communication among every one is very important and each one can share the collective wisdom.
- Associate makes students sociable when they are learning. If a student meets some

problems, he can turn to other accompaniers to discuss the problems. Helping and supporting each other in the learning process is very crucial.

- Role playing gives every student a chance to be a mentor, who is responsible for checking students' work. That is to say, helping other students learn is to help him strengthen some knowledge.

Knowledge management: it manages knowledge canonically and it is more convenient to produce, acquire and reuse the knowledge. On one hand, knowledge management can help students to construct the concept of knowledge framework. On the other hand, it can be shared and communicated commendably using the tool of knowledge transfer.

Performance support: performance implement can support individual learning, considering and collaborating to provide experience and improve learning efficiency. EPSS is a form of performance support, which applying widely in the enterprise, while for students MP3, PDA (personal digital assistant) and other Reference printed can also regarded as tools of performance support.

Assessment: this part can check knowledge base, learning style and mentality character of students, which would offer teacher clues to adjust teaching strategy and activity at next period.

6. An instance----Blended learning applying in university education

Owning resource is not mean owning knowledge. What universities meet recently is how to let students make resource into knowledge. Some educationists begin to consider the effect of deep learning. Deep learning is depending on what students have studied, not on how much time they have learned. So university education should put the course goal at the first place, and on the base of it, improve the learning and teaching efficiency.

6.1 The face-to-face learning mode combining with online-learning

The curriculum of Data Structure in our school has adopted blended learning mode to increase students' positivity and learning efficiency. This curriculum has its own Website （http://course.zjnu.cn/quyt/index.asp）, which mainly includes several parts: the latest inform, teaching lecture, resource download, experiment design and BBS. Students can land it at anytime and anyplace if they like.

Our learning and teaching strategy is focusing on face-to-face learning while network assistant learning is cooperated well. Figure 2 shows us the whole process of the curriculum of Data Structure's learning and teaching that actualized in our school.
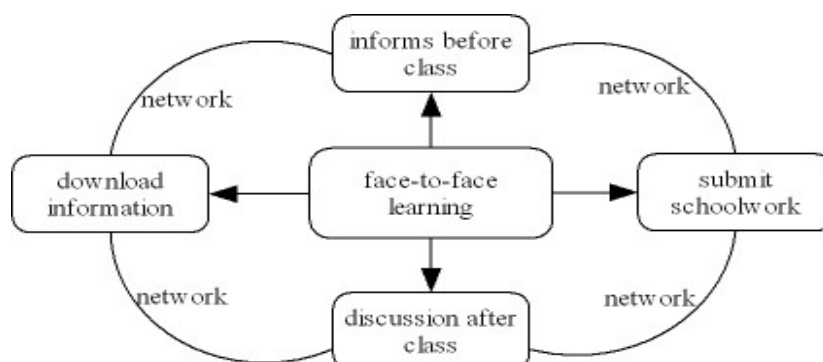
Fig. 2. Blended learning mode focusing on face-to-face learning

There is the latest inform in the first page of Web before class. Students can prepare something information interrelated to the next class in advance and know the knowledge which should be mastered. And teachers can also write some requests about the new lesson here to guide students to learn by themselves. Once the preparation is well done, the efficiency in class for both students and teachers can be promoted greatly.

Face-to-face learning is the most important part in this mode and other parts all surround it. Because students have already prepared well before class, they would ask teachers some questions in class, which they didn't understand well when they prepared. Teachers can also emphasize on some difficult knowledge in class to improve the efficiency for students listening and teachers teaching. The knowledge told by teachers would be the foundation of following tasks and this way can save much time for students to discuss and communicate between teachers and other classmates.

In the class, classroom activities include lectures, tutorial session, laboratory, review, questions and answers, open forum and presentation etc. Each course focuses in certain aspect of activities due to its syllabus requirements. Teachers can not only use blackboard, chalk and textbook as their teaching tool, but also can use multimedia facility to make class livelier and more active, such as computers, recorder and electronic project. Teachers should make use of electronic tools to get learning and teaching optimization, combining traditional teaching method, so that students would not feel boring and tiresome about class. This is what we pursue in teaching method.

BBS in the Website provides a communication flat with all the students and teachers after class. In this part, the dominant position of teachers is not as evident as that in the class. Discussion between each other in a peaceful atmosphere would make students more confident and aspirant. If students meet some difficult issues when they review information, they can ask teachers to help them on this flat in time. Students can also discuss with other masters-hand who are good at technical field. The discussion would arose their interest in some field and expand sight of professional knowledge.

After class, students may need to submit schoolwork or download some information and teaching lecture about the class. The website actualizes these

functions and makes this process easier than before. Submitting and downloading anything about the class can be done in the website. Downloading information is a part of knowledge extension. Students can learn better and share useful information with other people. What's more, teachers can limit the deadline of submitting to make semi-autoimmunization of schoolwork coming true. The phenomenon of submitting schoolwork on time is prevalent and the feedback from teachers is also in time.
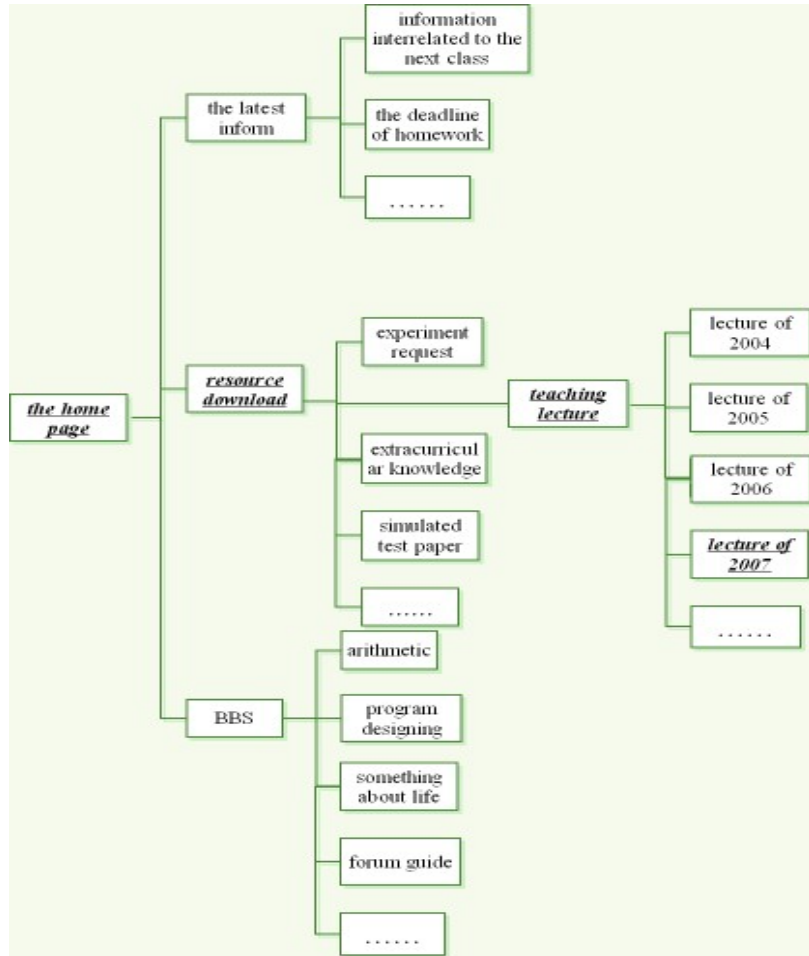

Fig. 3. The example of achieving the lecture of 2007 on the web

For example, if we want to get the lecture of 2007 on this web, we can gain it though the following path easily, which has an underline under the words. Figure 3 presents the framework of the curriculum web legibly. The home page mainly has three blocks, and they are the latest inform, resource download and BBS respectively. Each one has several small modules. Now we take the block of resource download as

the example. It mostly contains experiment request, teaching lecture, extracurricular knowledge, and simulated test paper and so on. In the teaching lecture module, there are many lectures in different academic years listed. So you can choose what you need. It is quite convenient.

6.2 Meeting the learning needs

In the blended learning model, knowledge would be delivered more effectively and efficiently. The model design may be more creative by providing the following features and arranging them in different learning stages: [6]

- Allow teachers to schedule their tutorials in a given period of time;
- Provide video indexing function for teacher to correspond the lecture note's content with video playback;
- Allow teachers and students to interact in a virtual face-to-face environment;
- Allow teachers to display and make remarks on the files they uploaded;
- Allow teachers to show special items such as 3-D objects through the connection to a visualizer.

Moreover, there is a need for a more flexible and practical schedule of tutorial sessions since most students have full-time work during the day. With the online learning platform, the tutorial sessions can be arranged with higher priority, such as starting at late evening to enable students to cope with their overtime demand. This is clearly more flexible for students and their work life style.

7. Conclusion and future prospect

Blended learning was first brought forward in the enterprise. It provides employers in the company many chances to understand some advanced knowledge and learn some new information. And now this mode of learning is adopted in educational field. However, it is not familiar with most people, but the new trend of blended learning for all levels of educational institutes is overpowering.

Blended learning mode focusing on face-to-face learning is considered as the most efficient. It combines advantages from traditional learning and e-learning, and it synthesizes different kinds of teaching media, teaching content and learning method. This paper introduces details about teaching activities into the web site which can help students learn more effectively inside and outside of the classroom. The mode can achieve teaching goal perfectly by multilayer activities between students and teachers.

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