Study on Blended Learning Approach for English Teaching

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Abstract—In this paper, the authors proposed a novel English teaching model based on Blended Learning to assist students in successfully mastering the courses. The model is realized as a combination of a face-to-face environment and online learning using an English teaching system. In the system, student dynamic model is established with semantics. The personalized learning resource recommendation is made by Support Vector Machines (SVMs) classifier based on the student dynamic model. The framework of learning resource management using domain ontology is described. A case study on Blended Learning approach for English Teaching is given. The results indicate that Blended Learning provides an effective approach for the English teaching.

Keywords—Blended Learning; English teaching; student model; personalized recommendation; learning resource

I. INTRODUCTION

In traditional teaching, the transfer of knowledge is achieved mostly by face-to-face lecturing. The student are not motivated enough to acquire knowledge actively. Along with the development of information technology and internet, the learning places are shifted from the traditional classrooms to internet gradually. The new teaching model stresses the information technology and network technology's role in teaching, which marks the beginning of a new-round teaching reform. The Chinese government has placed on the agenda a strong emphasis on both technology-enhanced English language instruction and expanded use of technology in education [1]. Various E-Learning systems have been developed during the last years. However, online learning is learner-centered learning model, and tends to emphasize on students' initiative learning too much and weaken guidance of teachers in learning processing. It results in lack of whole sight to the systematic of knowledge and duration of learning process. In [2], research results shown that students' satisfaction with online courses increase only in the presence of both quality online material and well-prepared tutors leading the course in a collaborative environment.

In 2004, the Education Ministry issued College English Curriculum Requirements. This requirement regulates: "While making full use of the modern information technology, the new teaching mode should fully consider and carry on the merits of the present traditional mode." This new teaching requirement brings a challenge for English teachers. It is necessary for teachers to build an appropriate teaching model for English teaching. For this reason, there has been an increasing movement toward Blended Learning approaches where learner can have opportunities for both online and face-to-face interaction with their teachers and classmates. Through the analysis of characters of Blended Learning, related theories in linguistics and learning and a survey study on partial students and college English teachers in University, this paper is trying to build a teaching framework based on Blended Learning in English course teaching. The aim is to choose a mixture that will highly motivate the students, and assist them in successfully mastering the courses.

The paper is organized as follows. Section I introduces the background of this research. Section II gives an overview of pedagogical theory. Section III describes the design of Blended Learning. Section IV demonstrates the proposed model in a case study of English course teaching. Section V provides the conclusions.

II. PEDAGOGICAL THEORY

A. Blended Learning

Blended Learning first came up in business training. Blended Learning is learning based on various combinations of traditional face-to-face lectures, learning over the internet, and learning supported by other technologies, aimed at creating the most efficient learning environment [3]. The concept of Blended Learning is rooted in the idea that learning is not just a one-time event, and learning is a continuous process. A single delivery mode inevitably limits the effect of a learning program. The comparison of traditional teaching and E-Learning is shown in Table I. Generally, Blended Learning means any combination of learning delivery methods, including most often face-to-face instruction with synchronous and asynchronous online learning.

TABLE I COMPARISON OF TRADITIONAL TEACHING AND E-LEARNING

Teaching Model	Traditional Teaching	E-Learning
Environment	Classroom	Home
Instrument	Face-to-face Lecture	Information Technology
Activity	Synchronous	Asynchronous
Strategy	Teacher Center	Student Center

Blended Learning is a connection point of traditional teaching and online learning and integrates the advantages of them. Blended provides various benefits over using any single learning delivery medium alone. Blended Learning increases the communication and response through synchronous and asynchronous tools on the internet, which

reinforces the interaction and collaboration through the community of inquiry. So Blended Learning overcomes the drawback of E-Learning and gives learners more chance to study alone but not study lonely than only face-to-face study. Blended traditional teaching and learning with the use of Web technologies is currently one of the major threads in learning technology research. Blended Learning model is especially valuable in language teaching and learning.

B. Constructivism

Constructivism is the basic learning theory of Blended Learning. It describes the development of knowledge through learning as a process of active construction of meanings in relation to the context and environment in which the learning takes place. Basic constructivism relies on the use of prior knowledge in the construction of new meanings. A learner's understanding of a subject is embedded in the experience of that individual. Previously constructed structures of knowledge are retrieved and utilized as discrete packets for the development of new knowledge structures. Spiro et al. [4] took this basic theory of constructivism a step further. They argue that a new element of the constructive process must be added to those that are already recognized. That new element is the use of pre-existing knowledge in the active construction of new knowledge. The pre-existing knowledge is brought together from diverse areas of understanding and reassembled into knowledge structures that can be used to interpret and construct new meanings from the new situation presented.

The process of knowledge construction by imposing meaning to learning experiences reflects the basis of the constructivist epistemology. Constructivism combined with information technology can bring about many advantages which are quite beyond the traditional teaching. Tam [5] provides an excellent overview of how technology can be used for constructivist purposes.

III. DESIGN OF BLENDED LEARNING

A. Student Model

Personalized service system is developed to help student obtain the just needed resources from large-scale learning resources. In the past, people placed importance on the technology of personalized services, such as recommendation technology, information searches technology, learner clustering technology and so on. The importance of learner model in personalized services has been neglected. It is simple logic that response individualized to a particular learner must be based on some information about the learner; learner model became a core or even defining issue for the field. Learner model maintains an explicit and dynamic representation of the learner. It represents the system's understanding of a learner. A perfect learner model would include all features of the user's behavior and knowledge that effect their learning and performance [6].

Kosba et al. [7] applied fuzzy techniques to analyze the logged data of the students' interactions with in the courses

and to built student, group and class models. Nykanen [8] developed Inducing Fuzzy model for student classification model for describing the performance of individual students in terms of mid-term exams and final grade.

In this paper, student model is built based on user behaviors and similar semantic. The student model contains two distinct sub-models, one for representing the student's language competence, and another one for representing student's cognitive characteristics and learning preferences (such as learning style, working memory capacity etc.). Student's language competence is evaluated from the five skills that is, listening, speaking, reading, writing, and translating, each skill being graded outstanding, very good, good, fair, and poor according to the teaching requirements. Student preferences model falls into two levels, the top level is a student model based on class preferences; the down level is a class model based on primary term preferences. In the process of modeling, dimensionality is limited through heuristic rules, and priorities are given through line weights. The student profile stored in model can be frequently updated based on the interactions of the student. Blended Learning based on student model is shown in Figure 1.
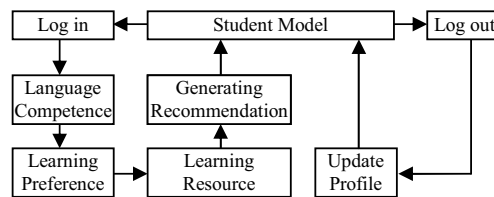

Figure 1. Blended Learning Base on Student Model

B. Personalized Recommendation System

Learning requirements and preferences of each learner tend to be different. The majority of online learning systems model the learner as an entity accompanied by a static predefined set of interests and options, missing functionalities like personalized capabilities and tracking of learners' input and relevance feedback [9]. Organizations must use a blend of learning approaches in their strategies to get the right content in the right format to the right people at the right time. Personalized support for learner becomes even more important. Recommendation systems in education should enhance learning efficiency. Many recommendation systems have been studied over the last decade. Existing techniques include nearest neighbor algorithm, Bayesian analysis, clustering technique, and many others. In this paper, Support Vector Machines (SVMs) classifiers were adopted to recommend the personalized learning resources based on the student profile.

The SVM is a novel machine learning method based on statistical learning theory [10] originally introduced by Vapnik. In recent years, the SVM has been extensively used to solve many classification problems. Given an input set of N vectors $\{x_i\}, x_i \in R^n$ sorted into two classes by labels $\{y_i\}, y_i \in \{\pm 1\}$ and a mapping function $\phi: X \to F$ that maps the vectors into a space where the two classes become

linearly separable, one can find a separating hyperplane in F, $\Psi \cdot x + b = 0$, that maximizes the margin between the two classes, and express Ψ as a linear combination of $\phi(x_1) \cdots \phi(x_N)$ using weights $\alpha_1 \cdots \alpha_N$ and labels $y_1 \cdots y_N$:

$$\Psi = \sum_{i=1}^{N} y_i \alpha_i \phi(x_i) \qquad (1)$$

A decision function of the SVM, which tells us on which side of the hyperplane a query vector lies, is then given by:

$$f(x) = \Psi \cdot \phi(x) + b = \sum_{i=1}^{N} y_i \alpha_i \langle \phi(x_i) \cdot \phi(x) \rangle + b \qquad (2)$$

And $\mathrm{sgn}(f(x))$ is the classification label of query x. To use the SVM to learn nonlinear functions $f(x)$, the kernel trick was invoked [11]. The kernel trick of the SVMs avoids working with the high-dimensional map ϕ by instead choosing a kernel function K, which induces the feature space F by defining the dot-product: $K(x,y) = \phi(x) \cdot \phi(y)$. While finding the separating hyperplane in F and thus the weights α_i can be done by solving the optimization problem:

$$\max_{\alpha} [\sum_{i=1}^{N} \alpha_i - \frac{1}{2} \sum_{i,j=1}^{N} \alpha_i \alpha_j y_i y_j K(x_i, x_j)] \qquad (3)$$

Subject to $0 \leq \alpha_i \leq C, 1 \leq i \leq N, \sum_{i=1}^{N} \alpha_i y_i = 0$,

Positive C is a parameter controlling the trade-off between margin maximization and training error minimization. The SVM is a new paradigm of the learning system. SVM technique is a powerful widely used technique for solving supervised classification problems due to its generalization ability. In essence, SVM classifiers maximize the margin between training data and the decision boundary, which can be formulated as a quadratic optimization problem in a feature space. Figure 2 depicts the way the SVMs classifier creates the personalized learning resource recommendation based on student model. The system can recommend the appropriate learning resource according to the updated student's profile.
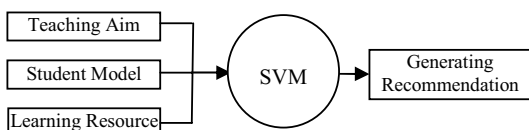

Figure 2.   The Recommendation System Using SVM

C. Learning Resource

An efficient and effective learning process depends upon the availability of learning resources, which in turn depends upon a systematic approach in managing them. It is thus, important to have a well-defined method in organizing and managing the collected learning resources of a chosen topic during the course of study.

Learning resources can be defined as any entities, either digital or non-digital, that can be used, reused or referenced to support learning. It basically includes documents, manuals, software, multimedia contents and so on. The Learning Object Metadata (LOM) is used to describe the properties or attributes that a learning object carries. The IEEE LOM standard specifies the syntax and semantics of the learning object metadata. It focuses on a minimal set of attributes required to manage, locate and evaluate the LO. Through applying the LOM standard, LO have a standard way to be described, and thus, are easier to be searched, evaluated, acquired and utilized. They are also capable to be shared and exchanged across any technology supported learning systems [12].

In the English Teaching platform, an ontology-based model for Learning Resources Management is proposed to facilitate the managing of learning resource. The model aims to provide a common platform to share the collected learning resources, to organize these learning resources in a way reflecting the knowledge structure of students. Ontology is a specification of conceptualization which can be used as a form of knowledge representation [13]. Different concepts in a certain domain can be organized in a hierarchical structure by means of ontology. This forms a key skeleton of Semantic Web which links up useful resources in a logical and semantic manner. In the learning perspective, the ontology may also be used in classifying some existing learning objects by describing the relationship between these learning objects. As such, students are able to associate and organize those resources in order to facilitate the learning process.

IV.   ENGLISH TEACHING PLATFORM

English teaching and learning is different from other subjects. English learning is a language acquisition process which needs not only physical and mental activities but also the communication with others in which one can experience different emotions and therefore get more recognition about him. This personal aspect makes language learning process quite different from what one experiences in self-teaching through courseware. Blended Learning can increase the communication through its online setting. Although classroom teaching can provide physical and emotional experiences, all the students can't get responses and the opportunity to communicate with others because of the limited time and a large number of students. Under the help of the internet, all these problems can be solved. The available communicative tools can facilitate communication. What's more, the advanced IT has made it possible for one to watch, read and listen to news or other materials in English online.

The English teaching platform is shown as Figure 3. It consists of five modules: user manage module, course manage module, evaluation module, intercommunion module, and resource manage module. User manage module is designed to verify user's identity. Course manage module is used to issue course information and control course teaching process. Evaluation module is used to evaluate the

learning effect of students and update students' status in the model. Intercommunion module provides access for student to ask for help and participate in collaborative activities when they study online. The course learning materials is manage by resource manage module, including courseware, exam resource and English corpus etc.
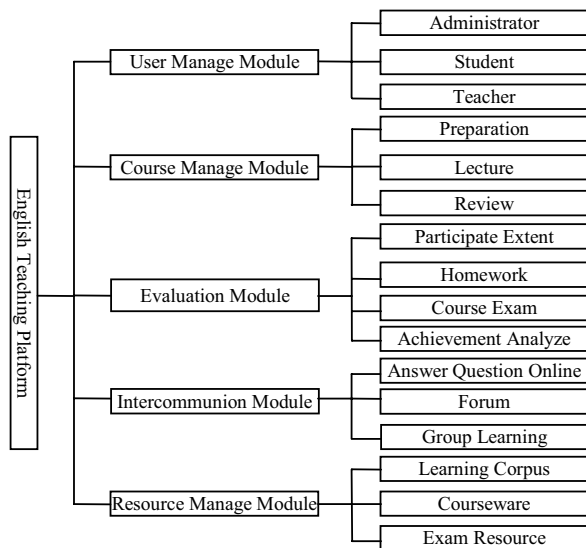

Figure 3.   English Teaching Platform Based on Blended Learning

English Teaching based on Blended Learning is realized on the English teaching platform. The learning process model is shown in Figure 4.
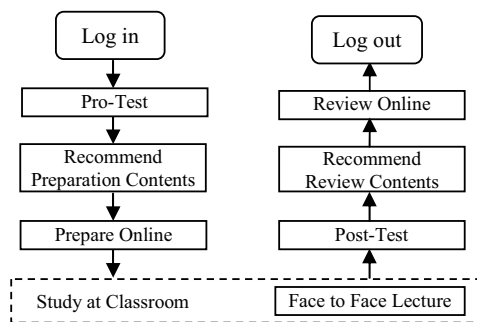

Figure 4.   Learning process of an English Course

The English course teaching based on the proposed model has the following features:

1) Students study basic knowledge as preparation online. The preparation contents will be generated by recommendation system based on student profile.

2) Teacher gives face-to-face lecture according to the teaching aims.

3) Students review online. The review contents will be created by recommendation system based on student profile.

V.   CONCLUSION

Analyzing the inefficiencies of the E-Learning system, this paper introduces Blended Learning model for English Teaching. Blended Learning combines various event-based activities, including face-to-face classroom lecture and E-Learning. It is characterized as maximizing the best advantages of traditional methods and E-Learning. Blended Learning increases the personalized learning and the communication and response through synchronous and asynchronous means in classroom and on the Internet, which reinforces the interaction, collaboration and critical thinking. Blended Learning provides an effective approach for English course teaching and gives a new train of thought and method for English teaching reforms.

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