

# THE E-LEARNING TEACHING MODEL BASED ON SERVICE SOFTWARE BUS IN INFORMATION SOCIETY

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## ABSTRACT

E-Learning emerges as the times require under the network environment. It is a new teaching and learning mode, this paper analyzes the meaning of E-Learning, teaching mode, as well as the traditional Chinese education influence. Service Software Bus (SSB) is a service-oriented software bus. Based on theory basis of existing general software and combing with loosely coupled service-oriented architecture technology based on business standards, a kind of SSB is proposed and designed. Such kind of service-oriented software bus architecture is then applied into E-Learning teaching platform to conduct overall design of E-Learning teaching platform. Detail design of each functional layer of the teaching platform is also given.

**Key words:** *E-Learning; Teaching Mode; Information*

## 1. INTRODUCTION

The Internet is rapidly changing our work, life, entertainment and learning, with its infinite capacity, wide coverage, interactive and customized features, rapidly changing the traditional. Imperceptibly, we have already entered an E- of the world -- E-mail, E-cash, E-marking, E-business, E-management, and E-library [1-3].

For education and learning is no exception. Today's learning needs to have reached an unprecedented level, although the form of education has changed from the traditional stage of school education extends to enterprise's on-the-job training and lifelong education, however, social skills and knowledge update quickly let various educational forms can not catch up with the change of learning needs. An engineering university graduates will soon find themselves in a few years ago learning curriculum has been unable to meet the new requirements of their jobs. Even the students if or simply repeat the class textbook knowledge, but also cannot meet the individual development and the competition in the future [4].

According to the traditional education mode, it must increase investment of teachers, training expenses, as well as the educational environment (such as schools, training venues and other), to adapt to the growing so fast learning needs. These

scarce resources almost always cannot be resolved, so we must find a new way of education [5].

The development of Internet brings about the opportunity, the development of network technology and media features allow learning acquired a new carrier; a standard E-Learning concept is becoming a global enterprise, educational institutions and government agencies to take seriously the new things. E-Learning global trends and commercialization in twenty-first Century will be the important education reform.

## 2. E-LEARNING: A NEW LEARNING AND TEACHING MODE

Literally, E-Learning can be interpreted as electronic learning, digital learning or e-learning, in the information environment on the teaching and learning behavior in general. From teaching form, E-Learning can not only in single environment with multimedia means to engage in active learning, but also in the local area network environment with online access to the server or CD tower, from the Internet to browse or download a curriculum and related curriculum study; also can through the use of the Internet, to carry out global within the scope of remote education and virtual teaching. From the connotation, E-Learning emphasizes the digital content and cyber source close combination. Its essence is to in the advanced

education/teaching under the guidance of the theory, information technology, the multimedia computer technology and network communication technology for teachers and students' learning, cognitive platform, through environmental education, teaching content, the digital learning tools, to change traditional teaching methods, teaching material, teaching media and the role of them and the relationship between students, realize a kind of all new teaching and learning model.

**SSB Introduction.** Bus service is a kind of loosely coupled software services and application integration between the standard way of calling and messaging service provides a simple call method. It also has some management and control functions. SOA is a services-oriented software development idea. Service bus framework provides a core framework for the centralized management of various services in SOA system.

To construct business system based on SOA, for application programs based on different Service Provider (SP) and many independent business logic service components, it needs service bus framework as a middleware system to provide information management services and transmission components function. Now there is powerful Enterprise Soft Bus (ESB), but it is complex to use them and expensive price, the reconstruction of the whole network's core business system data structures to use cost is not high. Analysis of business requirements and existing features of ESB products, business service bus should be a hierarchy, and provide the business logic component loading, service calls, message routing and forwarding, and other various data communication protocol adaptation function [6-7].

**Consist of Service Software Bus.** SSB is the message agent framework among component traffic logic and service stack service component, which implements intelligent management among different services in SOA. It also provides message queue system between up and down directions to complete traffic logical routing of upstream messages. The logical structure of software bus is consisted of business logic container, message communication layer and unified message encapsulation and so on.

Channel server is the core component to consist message integration bus, which provides various listening and management registration functions for message integration bus. It regards channel as basic message management unit, which can also be deployed in the channel the message server

integration services to provide specific components of integrated services. Business logic container is on the top of logical structure of service software bus to implement registration, management and routing of various logics. Message communication layer includes two parts of message queue container and message distribution component. Queue container can set number of synchronization requests, asynchronous requests and uplink message queue based on requirements of service software manager. Interface is a kind of component or program connects to service software bus, the main function of which is to implement protocol conversion and transmit standardized message of external service connections or communication protocol conversion software bus service [8-10].

### 3. E-LEARNING SYSTEM SPECIFIC TEACHING MODE

The so-called teaching mode is to show in certain educational ideology, teaching theory, studying under the guidance of the theory in a certain environment, the stable structured form of teaching activity process. Analysis of the current domestic various E-Learning systems teaching model, we found that these systems mostly adopt individual teaching, teaching and counseling, teaching mode. Although these models for the traditional teaching has improved, but still cannot be well adapted to the learning needs, still cannot reflect the essence of constructivism. With the in-depth development of the practice of E-Learning, some new teaching mode is the application and promotion of.

#### 3.1 Research-based learning mode

Research oriented learning model usually refers to one kind which takes the question as a carrier, to actively explore the characteristics of the learning activities, is the student in the teacher's guidance in learning and social life independently discover problems, explore issues and the process. In the course of the study, students should be under the guidance of teachers, using the field investigation (experimental), information retrieval, web survey, discussion and learning research methods, the various materials, comprehensive analysis, evaluation, so as to form their own opinions. For every student after completion of the work, the teacher is the organization of various types of preliminary conclusion analysis and evaluation, after all the teachers and students discussing the topic, eventually forming the unanimous conclusion or opinion.

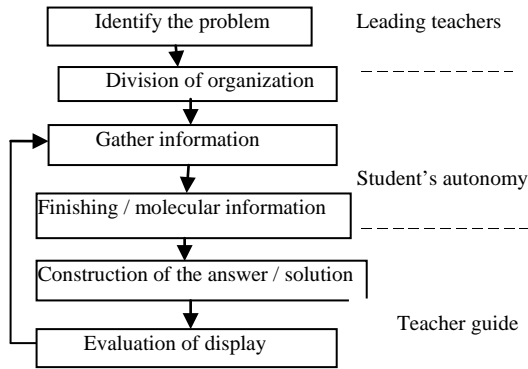


Figure 1. The Research-Based Learning Mode

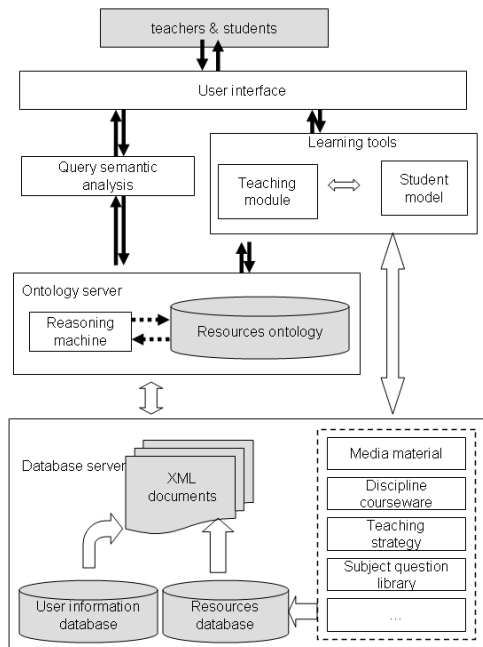


Figure 2. E-Learning System Framework Based On Semantic Web

As shown in Figure 1, research-based learning mode can be divided for defining the problem (task), division of organization, information collection, collation, analysis of information constructing/answer/solution, evaluation and display several link. This kind of teaching mode can make full use of various teaching resources (especially Internet resources), is beneficial to giving full play to students' subjective initiative.

**3.2 Case study mode**

In the E-Learning system, pattern can be designed as case study: students through reading teacher prior organization, on the server of a large number of cases, or directly through Internet on the corresponding website, in order to gain access to the various cases of perceptual knowledge; then, students under the guidance of teachers, through data analysis and decision making, then form the new concept.

**3.3 Discovery learning mode**

Discovery learning theory (discovery learning) is the main point: students in the learning situation, through their own search for answers to questions, thus obtaining a learning style. In the E-Learning system, it can construct the discovery learning environment, students will be placed on them to provide them with exploration. Analyze and grasp new concepts new theory tools, require students to explore and find to obtain new knowledge. Exploratory learning mode has four basic elements, namely problem, information, tips and feedback. The four elements of this organization and joined, can be in simple technical background, achieve good teaching effect. In order to make the most of the students to the successful completion of learning, discovery learning model should note: first, encourage the students according to their own knowledge and experience, to the question situation to make intuitive thinking, and strive to find the clues to solve the problem; second, the learning environment should be the structure, which contains other related concepts; third, environment of teaching resources and logical order of difficulty for students to the level of cognitive development and cognitive representation; fourth, you should choose high grade course, because the student must have a considerable knowledge and skills to complete guide discovery learning tasks assigned by the teachers.

**3.4 Resource-based learning model**

Internet based on the resources based learning mode, is referred to the student's study with active activities. The teachers give students learning problems or to be explored topics, students with Internet network, library and other multimedia information resources, independent inquiry learning, so as to achieve the teaching goal. As shown in figure 3.

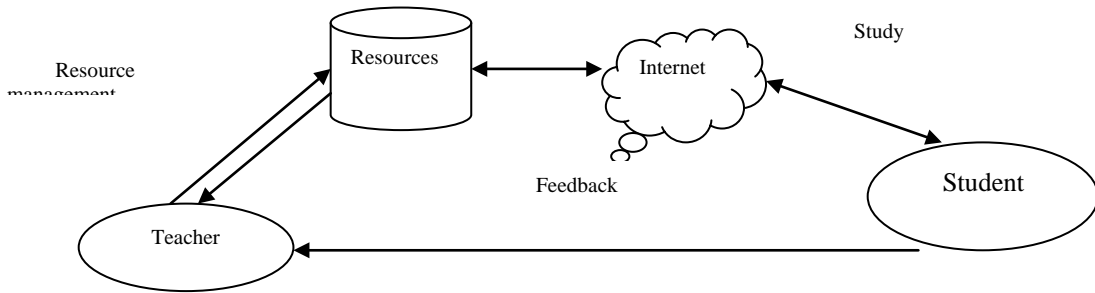


Figure 3. Resource based learning mode

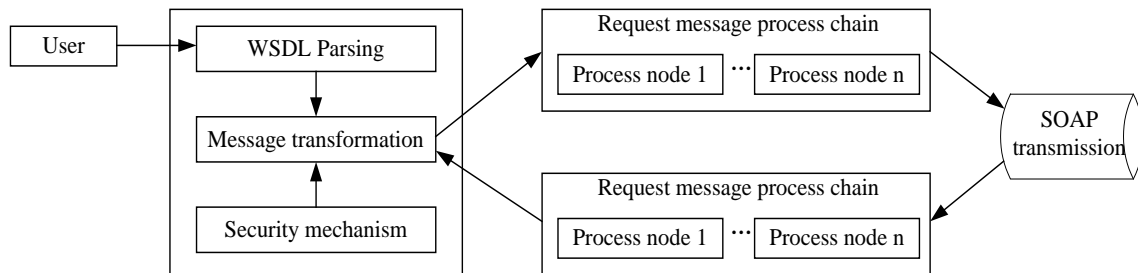


Figure 4. Presentation layer structure

The network resources based learning system can provide resource management tool, teacher organization, editing, management of resources to provide help for students to make use of resources, and facilitate learning. Teachers can accord the needs of teaching, at any time or resources; according to different teaching contents and characteristics of learners into flexible teaching strategies. Students can study online, download resource to realize flexible off-line learning.

### 3.5 Cooperative learning mode

Collaborative learning mode is defined, that is using Internet to establish various interaction, discussion, debate, consensus environment, for the local or remote multiple learners with the same problem with a variety of different perspectives and methods were observed and compared and analysis of an integrated environment, so that learners in this environment can reach mutual aggrandizement, and rise jointly.

Research shows that, students in the learning process, not only with teachers and learning knowledge dealing with, but also with their learning partners, through learning partners communicate the knowledge gained accounted for a large proportion of student's knowledge quantity. Moreover, involved in higher cognitive learning

situations (for example, problem solving or problems on complex analysis, comprehensive occasions), learning partners cooperation is particularly important. Under E-Learning terms, the separation of teachers and students, learning partners separation brings students very incommensurate, use Internet to strengthen students cooperation learning in a large extent can reduce the negative effect of E-Learning.

### 3.6 The virtual teaching model

Virtual teaching model refers to the use of computer technology, communication technology, simulation technology; artificial intelligence technology to achieve the two-way interactive teaching. It is a teaching model. It can be divided into the virtual classroom and virtual campus. Virtual classroom teaching is mainly used in satellite communication and two-way video conferencing system to achieve real-time, synchronous communication point to point, or one point to multiple point simulation teaching (including all types of meetings and discussions); virtual campus has involved the real campus of individual components, including the virtual classroom, virtual library, virtual laboratory, online education resources database, virtual academic

forum, virtual student societies, to the traditional education of college campus overall simulation.

#### 4 . ELEARNING MODEL TEACHING MODEL ON CHINESE TRADITIONAL EDUCATION INFLUENCE

The traditional teaching system for middle school students to gain knowledge sources are mainly by teachers and textbooks, which greatly limits the knowledge quantity and rate, makes the communication between students and teachers have certain obstacles. In the information society and the knowledge economy society, the students' knowledge sources are diversified, in addition to teachers and textbooks, all kinds of information media and network are provided for students to be inexhaustible, inexhaustible source of information. Students used the E-Learning, can according to their own needs to choose the school, teacher, curriculum and learning. This pattern will change the traditional teaching the role of teachers and the relationship between teachers and students, so as to fundamentally change the structure of teaching and education essence. Basically reflect in the following respects:

##### 4.1 Make learning become fashionable

The traditional classroom teaching is teacher centered teaching, which greatly restricts learner autonomy. And the emergence of the Internet has changed this situation. On one hand, the Internet will schools around the world, research, library and various other information resources together, become a great resource library; on the other hand, the world's outstanding teachers and experts from different perspectives can provide the same knowledge learning materials and teaching guide, anyone can be in any location by network access, forming multiple to multiple teaching methods. In this case, the learners in time and content have sufficient choice room; autonomous learning has become an inevitable trend.

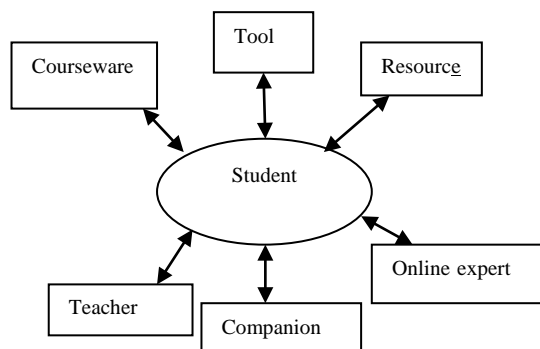


Figure 5. Network Access

##### 4.2 The full realization of the interactive and cooperative learning

In the traditional classroom teaching, most teachers have the opportunity and each student of the class to communicate, there are a lot of students and teachers did not dare to talk face to face because of various reasons. E-Learning changed all that. On the Internet, learners can download from the Internet the teacher lectures, homework and other related reference material, but also to be thousands of miles of teacher questioning, in line with other students in class discussion and evaluation of the knowledge, so as to mobilize the enthusiasm of learning.

##### 4.3 The full realization of the individualized learning

In the traditional classroom teaching conditions, teach students in accordance with their aptitudes and personalized learning is an idealistic pursuit. While the Internet makes possible to teach students in accordance with their aptitudes, learning to become a large-scale each takes what he needs. Process, to achieve the personalized learning. On the Internet, no unified teaching material, there is no unified schedule. Every learners can learn according to their own characteristics, at your own convenience time from the Internet free to choose suitable learning resources, according to their manner and speed of learning.

##### 4.4 The socialization of education, learning and life

In the current information age, new knowledge, new things whenever and wherever possible in large numbers, we will change from one-off school to lifelong learning, while the Internet for education out of the campus into society, providing strong support. This is an educational socialization, informatization process. Over the next several years, education from school to home, to the community, to the country, to any information technology popularization. The Internet will become a real school without walls; learning will become the life organic composition part, become part of daily life.

## 5. DATA ANALYSIS

Input to the relevant literature data the CiteSpace II software, the network node is determined to be a noun phrase, while selecting an appropriate threshold value, of running CiteSpace II software, get a Network Time line spectrum generated by the noun phrase, as shown in Figure



6. The export data in CiteSpace II, after finishing hotspot information derived E-learning, as shown in Table 1.

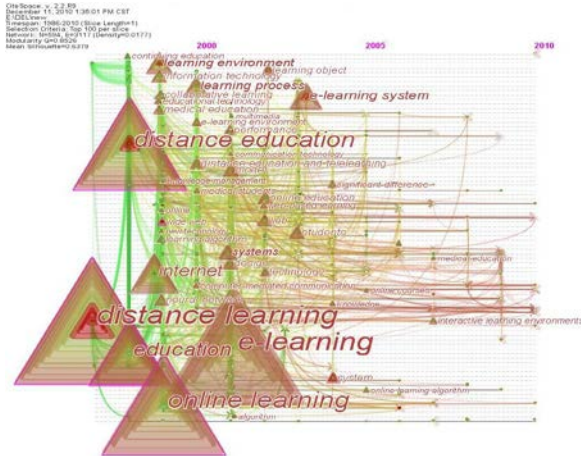


Figure 6. E-Learning Research Hotspot Mapping Knowledge

The nodes of each triangle in Figure 6 represent a noun phrase, the size of the node is representative of the frequency of the noun phrase, frequency times more noun phrases in a certain extent represents the field research focus.

Table 1 E-Learning Research Hotspot Information Statistics

No.	Frequency	Hot Words	No.	Frequency	Hot Words
1	609	distance learning	10	103	Systems
2	546	E-learning	11	96	information technology
3	481	online learning	12	95	Students
4	442	distance education	13	95	Design
5	327	education	14	94	neural network
6	225	internet	15	92	distance education and telelearning
7	139	E-learning system	16	90	online education
8	125	learning process	17	86	medical education
9	120	learning environment	18	86	Model

Frequency can be clearly seen from Figure 2 and Table 1, to remove as a search term and high frequency, distance learning, e-learning, online learning, distance education, education, the Internet appears in more than 200.

Noun phrase from Education and E-learning, rely on the Internet to develop corresponding;

occurrence frequency below 200 rather than 100 Hot Words: E-learning system, the learning process and the learning environment. E-learning system of research and development is an important part of the E-learning research, since the trough they go to see solid growth period experienced since 2002 E-learning, e-learning system developed to rejoin the use of E, the industry began to -learning system exploration [4]; learning process is a reproduction of the teaching scenarios, consistent with the above Bloom Taxonomy of Educational Objectives; E-learning learning environment to enable learners to impart knowledge from traditional way to autonomy, collaboration, interactive learning styles change; frequency less than 100 hot word is most commonly referred to in the E-learning Keywords: IT student, instructional design, distance education and online education. Worth mentioning is that the neural network of the word occurrence frequency is high, and has more applications in the research and practice of the E-learning neural network technology; Medical Education term high frequency indicates that the E-learning the breadth of applications in medical education, which are analyzed with the time series pattern (Figure 6) is substantially consistent with the results obtained.

6. CONCLUSIONS

Service software bus is the message agent framework between component business logic and protocol stack component, which completes intelligent management among different services in SOA system. Based on theory basis of existing general software and combing with loosely coupled service-oriented architecture technology based on business standards, a kind of SSB was proposed and designed. Such kind of service-oriented software bus architecture was then applied into E-Learning teaching platform to conduct overall design of E-Learning teaching platform. The research laid good foundation for implementation of E-Learning teaching platform.

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