

Design and Study of Web Collaborative Learning based on Activity Theory

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Abstract—Firstly the thesis investigates the problems in web collaborative learning through a brief introduction of the activity theory and WebCL. Then it proposes the assumption of applying activity theory to web collaborative learning. Finally it takes the online courses of the *Modern Distance Education* as example, analyses the basic elements of web collaborative learning based on activity theory, and designs its system and process.

Key Words—Activity Theory; Collaborative Learning; Web Collaborative Learning

I. INTRODUCTION

With the development and wide spread of Online Education, Web Collaborative Learning (WebCL) which uses internet technology to support collaborative learning has been emerging. It provides a new way of online learning for students and greatly raises students' interests and efficiency in learning. [2]

Engestrom, a Finnish scholar, develops an analytical framework of Activity Theory on the explanations of Activity Theory by scholars. As showed in Figure 1, he believes activity consists of three core components (subject, object and tools) and three sub components (rules, division of labor and community). And these components further form four subsystems: production subsystem, consumption subsystems, exchange subsystem and channel of distribution. [3]

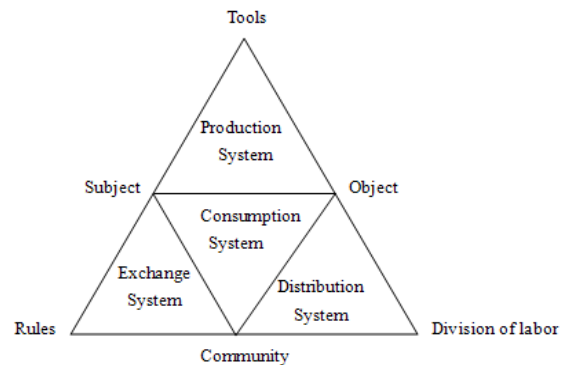


Figure 1. Structure of Activity Theory

The current situation of WebCL is not satisfying. Therefore, the author advances an idea to introduce activity theory into WebCL.

II. FEASIBILITY ANALYSIS OF WEBCL BASED ON ACTIVITY THEORY

A. Problems in the activities of WebCL

The author selects 100 online education teachers within Zhejiang Province as respondents and strives to find out the problems in the process of WebCL with questionnaires. The questionnaire survey is conducted under secret ballot and in company. During the questionnaire survey, 100 questionnaires have been handed out and 95 resumed. The 95% response rate meets the demand to conduct the survey. Through data analysis, main problems in WebCL are showed as follows.

1) Randomicity of grouping in Web CL. 2/3 teachers involved in the research said the teams in Web CL were organized at random or the members were appointed. As showed in Figure 2.

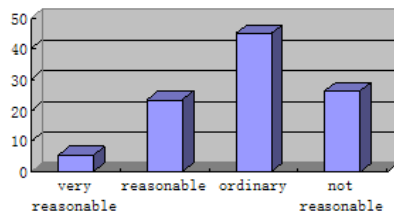


Figure 2. Reasonable degree on grouping in WebCL

2) Generalization of task selecting in WebCL. Before selected the WebCL, more than 60% teachers involved in the research failed to have an earnest analysis on the task whether it was suitable to be conducted in WebCL. As showed in Figure 3.

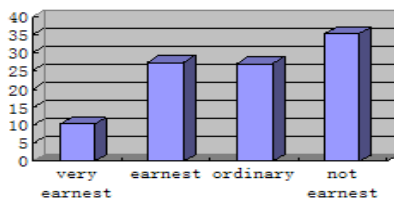


Figure 3. Earnest degree of task analysis in WebCL

3) Unclear division of labor in WebCL. Over half of the teachers involved in the research failed to take proper measures to clarify the division of labor. they were responsible for among team members. As showed in Figure 4.

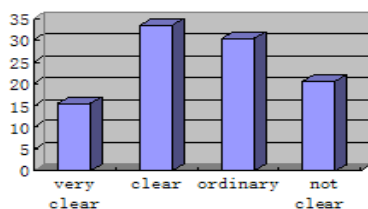


Figure 4. Clarity degree of division of labor in WebCL

4) Apt to lose control in the WebCL. Most teachers in the research claimed that it was the most difficult to organize and supervise the WebCL. As showed in Figure 5.

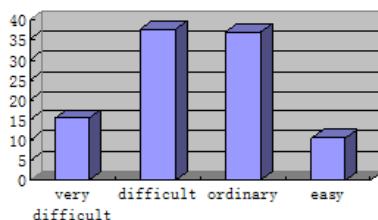


Figure 5. Difficult level of the organization and supervision in WebCL

5) Disparity in students' participation. A few students play a dominant role in WebCL while some give up the chance due to the fact that some lack the necessary collaborative skills as well as good learning habits and the organization and supervision from teachers were absent. As showed in Figure 6.

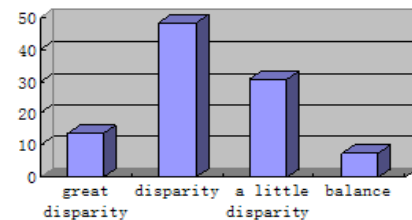


Figure 6. Disparity of participation of students in WebCL

Through investigation and analysis, the author concludes a main reason that causes the mentioned problems. It is that most teachers adopt foreign WebCL means without a complete understanding of its core. Therefore, they fail to design the teaching tasks combined with the basic components of collaborative learning and the particular situation of online education. Actually these above mentioned problems can be avoided in instructional design stages. Thus the urgent issue right now is to strengthen the practical study of WebCL and offer specified design scheme for WebCL activities.

B. Advantages of WebCL based on activity theory

1) Activity theory makes up deficiency of traditional instructional design

Social and cultural conditions are not fully taken into consideration within traditional instructional design. Seeing learners as individuals, instructional designers employ the diagnostic tools and teaching methods on account of individual psychology. This idea of instructional design neglects the relationship among students and the social and historical conditions of the time, thus it has clearly showed its inadaptability in the student-oriented practices. Considered the above-mentioned activity theory, it can be concluded that it is the activity theory that is a new frame which emphasizes the relationship among students and that between students and the social and cultural environment. Activity theory, as the guiding concept of instructional design in WebCL, not only

plays a role as a framework coherent with student-oriented instructional design, but also makes up the deficiencies in traditional instructional design. It meets the demands of instructional design in a new century.

2) Activity Theory lays stress on the subjectivity of students

Under the guidance of Activity Theory, the analysis of the components in the activity system focused on the students plays a dominant role. Therefore the idea of student-oriented is fulfilled. Meanwhile as the guiding concept of instructional design, Activity theory combines the subject with the environment concerned, giving full scope to the initiative of the subjects.

III. DESIGN PROPOSAL OF WEBCL BASED ON ACTIVITY THEORY—WITH REFERENCE TO THE ONLINE COURSES OF THE *MODERN DISTANCE EDUCATION* OPERATED IN ZHEJIANG NORMAL UNIVERSITY

A. Analysis of basic components

According to the structure of Activity Theory, the scope of collaborative learning is fully presented. It showcases the basic components of activity: learners, learning tasks, learning groups, learning recourses and means, certain rules in learning groups and division of labor within groups. These components interact on each other, resulting in four subsystems. To illustrate in the following Figure 7.

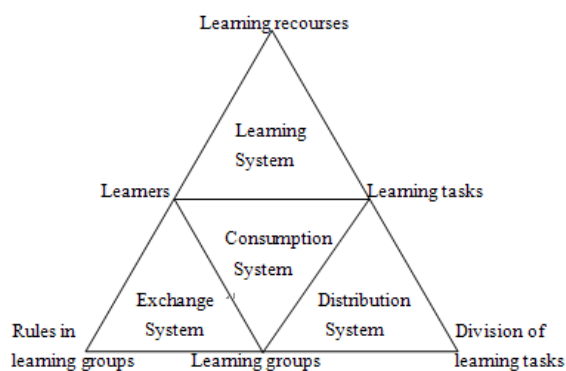


Figure 7. Activity system of collaborative learning on Activity Theory

The author will briefly analyse the basic components of Web CL on the facts of the online courses of the *Modern Distance Education* operated in ZheJiang Normal University.

1) Analyze the learners. As undergraduates from different regions with different culture background and academic records, students involved in this course mainly major in Educational Technology. They are mentally mature and have well equipped with information literacy and a good knowledge of computer and internet. They have a strong thirst for knowledge but lack experience in WebCL.

2) Analyze learning task. The major learning task of the course is to help students learn the development and application of distance education, keep abreast of current major virtual learning community and its functions and learn the instructional design and its supportive function of distance education. The learning task enjoys a neutral degree of difficulty and asks for the capacity to collect data needed from huge information.

3) Analyze learning group. The division of the learning groups of this online course depends both on students' own willing and the supervisor's allocation. The gender of a student, his academic records, the learning styles and the like should be taken into consideration. In addition, create like unions and keep frequent communication and exchange, release and share learning recourses among groups and group members. Every group acquires knowledge in competition while working together to fulfill the task.

4) Analyze learning resources and means. The learning resources refer to textbooks, online resources and the like. And the means refer to computer and internet, projector, Moodle platform, etc.

5) Analyze the division of learning tasks. The tasks are comparatively simple, including E-tutor assigns tasks and organizes online collaborative learning and that a person elected is responsible for the task division and that the group work joint efforts to complete the task.

6) Analyze rules of the learning groups. E-tutor sets down requirements for every task assigned. And the supervisor establishes related evaluation criterion and reward and punishment system based on the performance of students. Thus their performance is fairly evaluated.

B. Design for the activities process

1) The flow diagram

The author designs the flow diagram of WebCL based on activity theory after a close analysis of the advantages and disadvantages of the traditional collaborative learning. To illustrate in the following Figure 8.

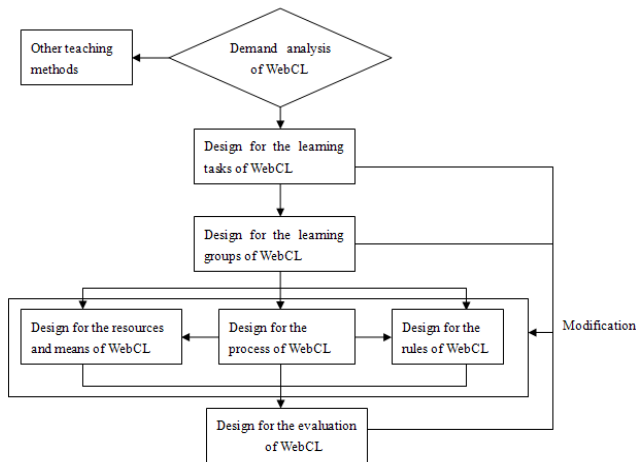


Figure 8. Flow diagram of WebCL based on activity theory

2) Case study

One lesson of the *Modern Distance Education* is offered as case study to help the readers better understand the process of WebCL based on activity theory.

a) Analyze the necessity of collaborative learning. The application of WebCL significantly contributes to the increasing interests of students in learning and communication between students and teachers, and between students and students as the online course provides a great deal of knowledge and is popularly elected. Meanwhile its application gives play to the Moodle platform.

b) Design for the tasks of collaborative learning. The course asks that a report should be handed in by group that indicates the development and application of distance education of different countries.

c) Design for the groups of collaborative learning. Firstly the class is divided into groups with 5 to 6 persons per group and the students are free to choose their partners. And then the teacher may make some proper adjustment, naming every group after the brand name of an automobile.

d) Design for resources and means of WebCL. In the course, PPTs and learning tasks are released on the Moodle

platform by the E-tutor and students of the same group are required to work together to write a report in the form of WORD through reading and online materials, etc.

e) Design for the rules of collaborative learning. Teacher creates behavior observation forms to record the learning process of the students. And students who frequently visit the website and post threads should be properly praised and encouraged by the teacher otherwise they should be warned. And measures should be taken to stir up the interests to participate the online course.

f) Design for the process of collaborative learning. Firstly E-tutor releases learning resources and tasks on the Moodle platform, coaches the division of students and organizes online communication and discussion. And then every group engages in collaborative learning, collecting materials according to the task and handing in the report in due time. Finally the teacher gives his evaluation on their achievements and the learning processes.

g) Design for the evaluation of collaborative learning. The teacher evaluates the performance and the report of every group and writes down the marks as reference to end results in the chart of overall quality evaluation of the group.

In addition, teachers should adopt other supportive teaching methods to meet the teaching demands.

IV. CONCLUSION

The paper analyzes WebCL based on activity theory, thus providing theory evidence for the design of collaborative learning in the light of online courses. The teacher should have his own teaching goal and give full consideration to the relationship among the subsystems in the design for the WebCL. Therefore the whole activity plays its role and the teaching activity is much more fruitful and effective.

REFERENCES

- [1]Guoxiong Xiang, Xiaoyun Lia. Activity Theory and its Impact upon Learning Environment Design [J]. E-education Research. 2005,(6):9-14. (In Chinese)
- [2]Xiaoning Zeng. Research and design of the Web based collaborative learning system. [J]. E-education Research. 2009:59~66. (In Chinese)
- [3]Bin Han. Research of the instructional design of collaborative learning on Activity Theory. [D].shanxi: Education Technology Department of Shanxi Normal University, 2009. (In Chinese)
- [4]Ronghuai Huang. Pattern of Web-based Cooperative Learning System.[J].Distance Education in China.2001: 42~47. (In Chinese)