Research on Application of Wiki-based Collaborative Lesson-preparing

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Abstract—Currently, many lesson-preparing systems, which simply emphasize web technology, do little consideration on the real needs of teaching. This paper argues that wiki may be an effective tool to reform present situation and proposes to develop an Eduwiki system which supports collaborative lesson-preparing activities. The main purpose of this study explores what motivates or hinders teachers to implement collaborative lesson-preparing through online observation and face to face interview method. Further, this system is used to implement collaborative lesson-preparing activities in different disciplines by more than 100 teachers in primary and middle school. The results of this study have proved that Eduwiki is effective on collaborative lesson-preparing and has important significance for the future application of Eduwiki.

Keywords-wiki; Eduwiki; collaborative lesson-preparing; teamwork; CSCW; communities of practice (CoP)

I. INTRODUCTION

Lesson-preparing aims at a specific lesson to design how to organize teaching and learning activities effectively in classrooms under the guidance of relevant instructional design theory and model, it is only from the micro-level to research instructional design. Prior research and writings on lesson-preparing have largely focused on learning environment design which concerns how to design tools for teachers to capture and share knowledge and skills to improve teaching quality [1], or ways in which members come together to discuss their observations of the lesson in an authentic classroom. For example, lesson study [2], is a professional development process which Japanese teachers engage in examining their practice systematically for effective classroom teaching. The use of lesson-preparing tools is not new in the field of educational technology [3]. What is new is the appearance of a great number of commercial lesson-preparing tools and their widespread application in schools. But the actual benefits of these tools are known very little until now. The emergence of wiki may become a good way for teachers’ collaborative lesson-preparing. Wiki is web-based software that allows all viewers of a page to change the content by editing pages online in a browser, which makes wiki become a simple and easy-to-use platform for cooperative work on texts and hypertexts. [4], [5]. According to Brian Lamb, wikis have five characteristics that separate them from other social or collaborative technologies: unique, collaborative, open editing, simple coding and evolving [6]. So, integration wiki technology into large functional teaching software may meet the needs of computer-supported collaborative work (CSCW).

Although most educators have used collaborative writing activities in their teaching work, these assignments are often more cooperative than collaborative. In other words, teams may work on different aspects of a topic and bring them together to create the final project. Wikis provide an opportunity to synthesize ideas and create a collaborative project that is broader, deeper, and more interconnected than that created in a traditional writing environment.

Actually, lesson-preparing systems should combine conventional and innovative tools compatible with current web technology to support well-know, well-tested techniques, and also to enable implementation of new and innovative lesson-preparing in a web-based environment [7]. So, the paper presents a wiki-based collaborative lesson-preparing system, named Eduwiki, which is developed in ASP.NET environment. Teachers have opportunities to participate in discussions that promote changes, such as discussing, sharing, and thinking about their teaching practice through Eduwiki [8], [9]. This is consistent with Wenger’s definition of communities of practice (CoP), “Groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” [10]. That is to say, Eduwiki is a CoP environment for teachers to participate in collaborative lesson-preparing and can identify what factors hinder or promote collaborative lesson-preparing among members of a CoP. [11]

II. RELATED WORK

A. Needs analysis and function of Eduwiki

The educational masters candidate from second middle school who study in Zhejiang Normal University are interviewed in field or via Internet. In view of that, the functions of lesson-preparing platform must consider teachers’ heavy burdens and avoid adding additional burdens for teachers’ free time. So, the functions of lesson-preparing platform in solving the lesson-preparing problem are shown in the following aspects [12], [13]:

- Putting lesson-preparing process from a simple expression to a dialogue process. One teacher creates a lesson plan, he/she can invite other teachers to modify and form an excellent lesson plan finally. The history versions created by many other teachers reflect teachers exchanging thinking and ideas in groups.

The research is funded by the Chinese National Education Science “The 11th 5 Years” Program (Project No. DCA060099)
• Recording and tracking the process of teachers’ collaborative lesson-preparing activities. History versions provide reference and help for teachers’ reflection and learning. Participant views the differences of different versions through version comparison.

• Making lesson-preparing of science and arts realized in the same platform. Teachers can do mathematical formulas and graphics creation using on-line editor. The math and science teachers should use the Eduwiki system in their lesson-preparing activities as well.

B. Differences of Eduwiki between regular wiki systems

Eduwiki is a collaborative lesson-preparing system, which can be used as an independent and integrated learning management system. The objectives of Eduwiki are special for school teachers to implement collaborative lesson-preparing. So, compared with other wiki systems, Eduwiki is of notable features:

Modular designing: the main structures and functions of Eduwiki consist of four main components, namely, the on-line editing environment module, the wiki collaboration module, the individual knowledge management module and the group knowledge management module. These four modules form a knowledge network (KN) through knowledge flowing and accumulating and can build networked collaborative learning environments (NCLEs). It provides a creative space where learning, innovation, and works can be integrated at three levels: one bottom-up, starting with individual and ascending to group and up to organization; the other top-down, adopting the reverse approach [14].

Connecting school’s needs: The functions of Eduwiki only meet school demands, avoiding the educational application problems which other wikis bring. It not only stresses the needs of collaborative lesson-preparing, but also emphases on the relationship between knowledge generation, accumulation, sharing and transferring in school and heritor school’s unique culture.

Visual editor: Eduwiki allows visual formatting of each page with the convenience of an inbuilt editor-HTML Area editor, similar to Microsoft Word. This ease of interaction and operation makes Eduwiki an effective tool for collaborative authoring. Anybody can use Eduwiki’s editor right away without training.

Encouraging mechanisms: Combined with corresponding incentive mechanisms, Eduwiki system encourages teachers brainstorming and does effective records of the contribution of all participants in supervision and management. Teachers are motivated to contribute to collaborative work; they are activated, and moved to the attentions as authors [15].

III. EXPERIMENT

A. Instruments

Eduwiki provides interactive functions for multidiscipline teachers to implement effective collaborative lesson-preparing activities. It mainly has the following structuring characteristics [16]: 1) collaborative on-line authoring with asynchronous interaction mechanism; 2) history-version list can store the relevant information of different authors’ editions; 3) choosing two versions at random to compare the differences; 4) providing posting comments to discuss and reflect lesson plans, teaching process and experience; 5) revising history-version needed to explain editor’s reasons; 6) recording and tracking the process of collaborative lesson-preparing for supervising the teachers’ contributions; 7) inviting collaborator to participate in Eduwiki for producing an excellent lesson plan; 8) converting html pages to word or pdf format for downloading the selected versions; 9) on-line editing with anonymity or virtual name for eliminating teachers’ fear of authority.

B. Participant

140 primary and middle school teachers (40 males, 100 females) who have registered in Eduwiki platform become the participants in this study. This gender ratio is normal for teachers in most Chinese primary and middle schools. The participants are from different disciplines, they can do collaborative lesson-preparing within discipline and interdisciplinary [16]. This concept is consistent with the idea of new curriculum reform in China.

C. Experimental Procedure

During the piloting study, teachers have implemented collaborative lesson-preparing in Eduwiki. The teachers have enough information and communication technology (ICT) skills; they can upload their lesson plans and teaching experience and reflection reports to lesson database directly. While working on Eduwiki, one teacher uses the on-line editor to post a detailed plan for a lesson, the others come to the collaboration space to participate in collaborative lesson-preparing. They may be invited to do it. For example, from Figure1, it is shown that one teacher is using on-line editor to create an English lesson plan. The contents contains a video file, a picture and text information.

Often, the other teachers discuss the advantages and disadvantages of the lesson plan through posting comments; they can use the collaborative on-line editor to incorporate their ideas in the lesson plan and explain why to revise like this as well. They can choose two versions from the list of history-version to compare the differences. For example, from Figure2, we can find that the differences of two versions are shown in different colors. Thus, the contributions of different collaborators are clear at a glance. All of the above process can be tracked and recorded by Eduwiki.

Finally, through collaborative lesson-preparing in Eduwiki, each teacher can use a lesson plan integrated many teachers ideas in an authentic classroom. After the procedure, the teachers can share and reflect merits and demerits of the lesson through brainstorming on Eduwiki.

The piloting study of the above process are all observed and collected through online observation from March 27, 2007 to March 1, 2008 (except July and August). 15 teachers (3 males, 12 females) who volunteered to participate in our study were interviewed. The semi-structured interview format has been used, so that the interview questions mainly focus on key topics pertinent to the study’s research that we wished to explore. Examples of the semi-structured interview questions were:
How long have you been working as a teacher? What discipline do you teach? What do you typically do in Eduwiki?

How comfortable are you participating in Eduwiki to prepare for a lesson? Why?
What is the advantage and disadvantage of Eduwiki?

In order to increase the validity of our findings, member checking is used for sharing the participants’ viewpoints with the other participants to clear up possible areas of miscommunication [17], [18]. Two types of member checks are utilized [19]: (a) During interviews, we restated, summarized, or paraphrased the information received from the interviewees to ensure that what was heard was indeed correct; and (b) Results and findings were sent to the interviewees to read for correcting potential miscommunication.

D. Experimental results

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<th>Teachers’ views</th>
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All the data provided by Eduwiki are kept for teachers and researchers to examine the results. The Chinese, Math and English teachers have a high passion for participating in collaborative lesson-preparing activities from the histogram of automatic generation by the system (see Figure 4). For example, the records of comments, history-version, revision reasons, teaching video, teaching reflections and digital materials created by Chinese teachers are up to 986, 428, 401, 70, 162 and 739 respectively. The three different sources of data (Chinese, Math, and English) are analyzed in order to assess the functions and patterns of collaborative lesson-preparing by the teachers. A large number of data reflect the powerful function of Eduwiki supporting collaborative lesson-preparing. Teachers are very glad to share their lesson-plans to others and get other’s suggestions, this interaction function inspires teachers to participate in collaborative lesson-preparing initiatively.

At the conclusion of our analysis, five themes or categories of motivators are found: school leaders’ support, reciprocity, related to daily work, collectivism and interest of the interaction environment (see Table 1). All teachers unanimously consider the school leaders’ support is the primary factor that motivates them to participate in collaborative lesson-preparing. Teachers participate in collaborative lesson-preparing not only an important indicator for teacher professional development, but also link with their rewards. So, school leaders’ support ensures it is successfully to implement collaborative lesson-preparing in Eduwiki. The process of collaborative lesson-preparing builds a mutual and reciprocal environment that is suitable for special lesson-preparing needs [20]. Teachers can share their lesson-plan to others and can get other’s suggestions; the interaction function inspires teacher’s interests to participate in collaborative lesson-preparing initiatively.

Our study further suggests that the majority of teachers are motivated by multiple rather than individual motivators for sharing and contribution lesson plans (see Table 1). Results also show three themes of barriers: lack of time, lack of ICT skills, and satisfaction status quo. Results suggest that teacher on-line collaborative lesson-preparing is most commonly hindered by the lack of time and lack of ICT skills. Lack of time is actually an issue of current school teachers in China; because every teacher has many teaching tasks and pressures; especially the mid-leader in school, they have both teaching tasks and clerical work. So, the quality of collaborative lesson-preparing is depending on how busy the teachers are with their work. Teachers’ lack of ICT skills also impact their collaboration, effectiveness and quality of lesson-preparing. Because lack of ICT literacy makes them can’t express their right means to prepare for lessons [21]. But integrated visual editor and non-technology operation are an urgency task for our developer group. Results also suggest that satisfaction status quo is the barriers for collaborative lesson-preparing. At the beginning stage, if teachers can’t feel member identity in the virtual lesson-preparing environment, these teachers have negative attitude for collaborative lesson-preparing. Because they have considered their current instruction methods are success, so they wouldn’t want to change their lesson-preparing ways. So, how to overcome this problem needs the participants to solve.

IV. EVALUATION

Evaluation is very important for experimental study. It is not only effective for demonstrating the feasibility and effectiveness of Eduwiki, but also can provide feedback information to adjust the design of Eduwiki and make its function better. Eduwiki builds the collaborative lesson-preparing environment as cognitive tools. It abandons sole purpose of conventional lesson-preparing by individual teachers. Many teachers want to use Eduwiki system for reducing their burden. As teachers point out:

- Miss Hua: Collaborative lesson-preparing is a new concept. If teachers of all subjects preparing lessons use this manner, then teachers will save a lot of time to prepare lessons. We hope to use this platform for high effectiveness preparing lessons as soon as possible. (Quotation from a teacher in Haiyan middle school)
- Mr. Ying: Collaborative lesson-preparing system can make everyone modify other’s works and save as their own. It is reported that Eduwiki provides some instructional design templates for teachers, so I want to use it quickly. (Quotation from an Ed.M who is in Baiyun middle school)

It has been found that many teachers have the will of application Eduwiki. They hope they can use it for preparing lessons and doing teamwork. The teachers who have used Eduwiki have many points on Eduwiki. Eduwiki makes some breakthrough progress for lesson-preparing, as teachers point out:

- Miss Ren: My traditional view about lesson-preparing is only preparing lesson plans. After using Eduwiki, I feel that Eduwiki not only a collaborative lesson-preparing system, but can do study, negotiation, discussion, collaboration, reflection, group work and research. It combines educational needs closely. (Quotation from an Ed.M who is a middle school teacher)
- Mr. Le: Using Eduwiki to carry out lesson-preparing saved a lot of time. I didn’t think...
that Eduwiki also can make students do English composition writing and achieve proud effects. Wonderful! (Quotation from teacher in Yinzhou middle school)

From these comments, Eduwiki makes teachers have achieved much results and it has been received good assessment.

V. CONCLUSION

This study provides that Eduwiki isn’t a platform only for improving conventional lesson-preparing; instead, it forms a common environment for group discussion and negotiation further [22]. Building wiki-based collaborative lesson-preparing environments will be one of important educational applications of web2.0. Using Eduwiki doesn’t mean a complete denial of conventional lesson-preparing activity. The advantage of Eduwiki can provide a special platform for primary and middle school teachers’ individual or collaborative lesson-preparing and will reduce teachers’ burden. Eduwiki overcomes the drawbacks of conventional electronic lesson-preparing systems, which is considered as successful operation of campus network and high efficiency of the electronic teaching. The advantage of Eduwiki can provide a special platform for primary and middle school teachers’ individual or collaborative lesson-preparing and will reduce teachers’ burden. School leader support ensures implementation of collaborative lesson-preparing successful. The process of collaborative lesson-preparing builds a mutual and reciprocal environment; this can form eminent collaboration culture in teacher group up to school organization.

As with any other research, limitations of our work need to be noted. For example, monitoring and tracking process is not clear; it also can’t absolutely prevent copying other teacher’s lesson-preparing, the relatively small number of participants being surveyed, etc. The other attempts should be carried out in order to solve such problems and make it upgrade perfectly. Future studies with larger sample sizes would be useful to verify our work. Thus, Eduwiki can be seen as an application of ICT to promote in-service teacher professional development. We believe this is a topic pertinent to the field of educational technology and thus merit further research.

REFERENCES