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Developing a Real-time Interactive Social Learning Platform Across Classroom Borders

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Abstract: In this paper, we have developed a real-time interactive social learning platform (ISLP) for higher education. The objective is to enhance interactive learning and accumulate knowledge for worldwide dissemination and idea sharing. ISLP combines the features of real-time recoding, synchronized broadcasting, note taking, and interactive timeline for interactive feedback and collaborative learning. The teaching and learning activities could be broadcast across different locations in time and space through use of the proposed platform.

Keywords: social learning, mobile learning, social media, interactive learning, tagging

1. Introduction

With the rapid development of mobile communication and sensor technologies, opportunities for conducting new learning strategies by integrating authentic learning environments and the resources of the digital world have attracted much attention from researchers in both the fields of education and computer science [1]. The content of open presentation platforms has been transformed into learning materials such as the TED conference uploading speech process and into live video broadcast all over the world via web-platform. The online social community is inspired by speakers who can widely disseminate their ideas [2]. Social media platforms such as Facebook and YouTube provide an arena for sharing and distributing participants' work by use of multimedia [3]. There is an inherent social network in technologies to enhance e-learning systems, where the main actors are teachers, learners, and learning resources. Social interaction allows the learner to reactivate and reconsider getting support and help by participating in real problem solving [4]. Today, both traditional teaching and online teaching are making great use of multimedia as teaching materials. We argue that the current teaching and learning behavior such as traditional lecture has the following drawbacks: 1) lack of multi-way interaction and immediate sharing of knowledge among learners 2) limitations of classroom boundaries in that learners have to set foot in a traditional classroom, and 3) having open course videos which take a lot of time to review. However, many researchers are only focused on certain technologies to enhance specific teaching and learning behavior. It is important, therefore, to combine social media, mobile learning, and an interactive environment to create an integrated environment for learning in higher education.

2. Design Concept

To develop an interactive social platform, we started last year with brainstorming sessions in many of the higher education classes in the Institute of Creative Industry Design and the

Institute of Education by discussing the needs and problems of the current education environment, as shown in figure 1. By observing, brainstorming, studying in the field, and interviewing teachers and students, we have concluded that two important criteria for future classrooms are:

Interaction: how to improve the interaction between students and teachers, between students and contents, between students and their tools, and among students.
Engagement: how to enhance the learners' motivation for achievement and help them become more engaged in the classroom.

As a matter of fact, many researchers have found that communication among learners can enhance performance for all learners in the scenario of online learning. Fostering interaction among people who use online learning environments does indeed support deep learning and a high level of engagement in practice [5]. The more interactive the activities that emerge from the class, the greater the learners' motivation is. Learners will also focus their attention on learning and have more engagement in the classroom. At the same time, cooperative learning among the learners and interactive teaching by the teacher are very effective [6]. Therefore, communication and participation are two of the most important elements of classroom interaction.

Figure 1 Future classroom brainstorming

In this section, we state the use scenario of the classroom of the future. The suggested platform is written in Flex and built on an adobe flash media server. Each participant brings his or her own portable device to the classroom. At the beginning of the lecture, participants log in to the multimedia server. Our work divided the participants into presenter, synchronous learners, and asynchronous learners, as described in the following subsections.

Presenter
When the lecture starts, the camera records the presenter or teaching materials. The recorded video is stored in the multimedia server to become social media content that learners can surf in the future without any time limitation. Synchronous tagging feedback tagged by synchronous learners is always displayed on the interactive screen. The presenter can also see the synchronous changes and understand the learners' thinking by looking at the dialogue box. If necessary, the presenter could immediately clarify the learner's doubts.

Synchronous Learners
Synchronous learners could use portable devices to engage the lecture by receiving a real-time broadcasting video without any limitation of location boundaries. Synchronous learners may tag comments or press buttons when they want to give positive or negative feedback during the presenter's lecture. Tagging and pressing to give feedback is always

possible during the presentation. The presenter cannot control when or how a learner uses the synchronous tagging function. The learners can also see the latest feedback through their device. The tagging function records in the dialogue box to whom the comment is sent and when the comment is being sent to the presenter or other learners. For retrieving convenience, we present the feedback with sequencing on timestamps and show the timestamps chronologically on a timeline.

Asynchronous learners

Asynchronous learners can choose and review recorded videos anytime and anywhere. Asynchronous tagging can be introduced when users want to share their opinions and tag the video content. Notice that the darker the node is on the timeline, the more tags there are on the timestamps. This means that many learners are interested in the topic at this presentation time, so a lot of feedback is tagged and recorded. When an asynchronous learner clicks a tag node on the node, the interactive social learning platform (ISLP) moves the video time index to the corresponding tagging location to reduce the amount of time for aimlessly retrieving the video. Therefore, the asynchronous learners can directly select and watch the most popular section and exclude the boring sections from the historical "good" or "disagree" statistics so as to save time.

We proposed an ISLP to surmount the limited classroom boundaries by combining the popularity of information networks and mobile devices for portability. Using the ISLP, learners can ubiquitously watch the lecture content and immediately take notes via the broadcasting and receiving video on the portable device. In computer-augmented interactive learning, the teacher immediately is aware of the learners' feedback and so can provide answers immediately through dialogue and interaction for better learning results. After class, learners can rely on the tagging history to directly select the most popular section, thus saving time.

3. An Interactive Social Learning Platform (ISLP)

In order to create more interactive learning environment and enhance learning engagement, we developed ISLP to record and broadcast videos for learners' real-time watching, control the remote cameras in any view desired, and show the feedback results chronologically on a timeline. The significant functions corresponding to the features are:

Synchronous broadcasting: The learning processing is recorded and broadcast to the web synchronously.
Instant tagging: Learners can synchronously access and tag the real-time broadcasting video.
Dynamic displaying: The real-time feedback timeline collects and displays the instant feedback chart.
Interactive retrieving: The recorded video can be retrieved and more comment tags can be added through the asynchronous learners.

We have designed a web-based interface of the ISLP, as shown in figure 2. The interface is composed of four areas. A video display arena exhibits the real-time recording or broadcasting video. Different types of buttons such as "Good," "Disagree," "Question," and "Comment" can be utilized for user interactive feedback. Learners can engage with the presentation and express their feedback in real-time using buttons or text messaging for sharing ideas, comments, or questions. Thus, the participants can see the messages or visualize the statistics from the text box and feedback timelines that are associated with the

video content. It is clear that the teaching and learning process can be transformed from a limited one-way interaction into an open multiple-way interaction.

Figure 2 Interface of the interactive social learning platform

4. A Classroom Without Borders

An interactive social learning platform has been installed in the future classroom in the Department of Architecture, National Cheng Kung University (NCKU). The platform was activated in the beginning of the spring semester 2011 and continues to be used for academic lectures. We applied ISLP to two real-world examples. The first example is a real-time broadcasting speech to other spaces. A professor gives a speech at a coffee shop as shown in figure 3(a). Around 30 audience members attend this speech face to face with the presenter and link to a multimedia server all at the same time. The server streams the recorded video and prepares for broadcasting the live speech to other learners by setting a general webcam as a real-time recording tool. In addition, the learners in another course in the classroom also log onto our platform using a broadcasting service to watch the live video and submit their feedback by tagging the video. When the professor finishes the presentation, he/she reviews the tag content provided by the learners and members of the audience during the lecture. Based on the timeline associated with the tagging types and video content, the professor can discern the learner' thoughts and immediately give an interpretation based on their questions.

The second example is synchronous watching of live video from different locations through the web-platform. Professor Huang in the Department of Architecture at the National United University presented a seminar to senior undergraduate students, introducing various courses in the graduate programs in Taiwan. He found that his friend, Prof. Chang of NCKU was online, giving a lecture for an important graduate course—the Design Review graduate course. So, Prof. Huang "knocked" on Prof. Chang's door in the web-platform. Prof. Chang broadcast his class to Prof. Huang's students, providing the learners with a very real sense of actually being there as graduate students. The teaching materials and learning activities were broadcast across different locations anytime and anywhere, as shown in figure 3(b).

(a) Coffee Shop (b) NCKU Classroom

Figure 3 Cross-border Lecture Learning in (a) Coffee Shop, and (b) NCKU Classroom

5. Conclusion

In comparison with existing social media platforms, ISLP can provide advanced features of real-time recoding, synchronized broadcasting, note tagging, and an interactive timeline and can be implemented in the higher education environment. ISLP surmounts classroom boundaries and allows learning to take place anytime and anywhere. Thus, we provide a real-time interactive social way for enhancing learning motivation and accumulating knowledge for worldwide dissemination. Future research will use this study as a pilot study to investigate whether different visualized interface designs and interactive functions are needed for on-site face-to-face students as well as off-site students when using ISLP as a useful tool in higher education. In addition, the quality of note taking, interaction, and interactive feedback generated by students will be further analyzed to design better, more robust research results about how ISLP can be modified to successfully enhance interactive learning and idea sharing in higher education.

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