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An annotation tool for lesson study

Shotaro Hori[†], Tatsuya Terada[†], Yukari Kato^{††}, Hironori Egi^{†††}, Wataru Tsukahara[†] and Masaki Nakagawa[†]

[†]Development of Computer and Information Sciences, Tokyo University of Agriculture and Technology [†]†[†]Information Media Center, Tokyo University of Agriculture and Technology

2-24-16, Naka-cho, Koganei-shi, Tokyo,184-8588 Japan

††Center for Higher Educational Development, Tokyo University of Agriculture and Technology

3-5-8, Saiwai-cho, Fuchu-shi, Tokyo, 183-8509 Japan

E-mail: 50007258508@st.tuat.ac.jp, {t-terada, Kathy, egichan, w-tsuka, nakagawa}@cc.tuat.ac.jp

Extended Abstract

To improve lesson in primary and secondary education in accordance with students' comprehension level, evaluation of teaching performance has been carried out by questionnaire and lesson study [1]. However, in Japanese universities, lesson study in the context of faculty development is not popular. This is due to the fact that it is difficult for participants to spend long time for classroom observation and reflection discussion. Even if they have time for discussion, unfocused discussion often causes less fruitful and mutual understanding. We are developing an annotation tool not only to solve the above-mentioned time and space constraint but also provide benefits owing to archiving lessons and their reviews. Considering that handwriting is good for note taking [2], we propose a pen-based annotation tool by which reviews can write comments and draw marks onto on-line and off-line movie of class observation-

We assume the system is used under various situations such as:

Situation-A) Reviewers attend a class and review class activities. They annotate their review for the lesson while attending the class.

Situation-B) Reviewers annotates a lesson while reviewing a recorded lesson movie, which allow them to add annotation on the recorded movie.

Situation-C) Reviewers and teachers have reflection discussions with regard to annotated movies and they may add further annotation.

By using the system in the above situations, reviewers are free from time and space constraint. Reviewers annotate comments directly onto movie played on a tablet PC (see Fig. 1), which allow them to write comments on exact targets in the movie. As a result of these features, discussion will be more focused and condensed referring annotation during lesson study procedure.

Figure 1 shows a screenshot of the system. Functions of the developed tool are as follows:

(i) Annotation area

Reviewers can put evaluation stamps and handwritings directly onto this area using a digital pen. Top-right area shows live recording movie or replays pre-recorded movies. Users can annotate on the both types.

(ii) Handwritings

Handwritings written by a digital pen are displayed in the annotation area with a color selected by reviewers. We provide four colors: black, white with grey contour, green, and red. Eraser is used when reviewers want to erase previously written handwritings.

(iii) Stamps

Frequently used comments are iconized as "stamps" beforehand so that reviewers do not have to write the same comments repeatedly. It not only saves the time for annotation but also will ease quantitative evaluation of lesson by counting number and types of stamps used. Both qualitative analysis on handwritten annotation and quantitative analysis on placed stamps will enrich the evaluation on lessons.



(iv) New Page

By pressing "New Page" button, all the handwritings and stamps are erased.

(v) Undo

By pressing "Undo" button, most recent action is cancelled.

(vi) ScreenShot button and Summary Area

This button takes a snapshot of annotation area including handwritings, stamps and movie. Each time reviewers press the button, a thumbnail of snapshot is added at the right side end of the summary area below the annotation area (Fig.1). When reviewers click a thumbnail during movie play, it causes the jump to the point when the snapshot is taken.

Two reviewers used the tool in the situation-A of a 90 minutes class for sophomores, majoring in mechanical engineering. One reviewer used a movie taken from a camera located backward to view both teacher and students (Fig.2). The other used a movie taken from a camera located in front of the students to observe them. The reviewers started to add annotation from the beginning of the class. Reflection session was held immediately after the class. In this evaluation, we observed:

- **a.** By using the developed tool, focus of discussion can be selected and retained. Previously discussion tended to be divergent in reflection session.
- **b.** Annotation differs depending on location of a movie camera. The movie camera facing students provides teacher's view while another facing the teacher can provides students' view. Amount of comments were different between these conditions and we observed from the comments that the movie facing students was better for evaluation. A future task would be displaying two or more than two movies in the annotation area.

From these observations, the tool facilitates reflection in lesson study, and it requires shorter time for reflection session. Furthermore, we obtained an implication that the use of different views with several movie cameras in a classroom could provide better user experience with rich classroom information.

In the next step, we plan to add a function of handwriting recognition and search so that reviewers and teachers can search specific comments.

Key words Faculty Development, Class Evaluation, Intelligence sharing, Educational Improvement, Peer Reviewing,

Pen Interface

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