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# Development of a Real-time Evaluation System for Microteaching

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**Abstract:** We have developed an evaluation system for microteaching. Unlike conventional evaluation methods using paper medium, our system enables evaluation comments to be inputted in real time. In addition, our system enables evaluation comments to be displayed using a video while microteaching. As a result, an evaluator is able to input a comment while watching the teaching practice and the student is able to check the comments while watching the video.

**Keywords:** Real-time evaluation system, microteaching, teaching practice, streaming

## 1. Introduction

Microteaching is used to develop teaching skills, where a student practices teaching, and their teacher evaluates them. Many researchers have conducted research into methods of evaluating microteaching. We consider that we are able to classify the following sentences from previous research in terms of "a time and a medium of evaluation":

(i) An evaluator watches a student's teaching practice, and after that, they fill in the evaluation items on the evaluation form. This has been the most common way used to evaluate a student.

(ii) After recording a student's teaching video, either the student or the evaluator watches the video, and they fill in the evaluation items on the evaluation form. Kpanja (2001) and Ito (2006) described using video as an effective medium to evaluate themselves and others, and for improving their teaching skill [1] [2].

(iii) An evaluator watches a video saved on the digital media, including DVD and the Internet, and they evaluate it. This enables them to evaluate remotely. Nishino (2004), Okura (2006), and Shiraishi (2006) have developed a web evaluation system. The evaluator can add their comments to a scene from the video using this system, and the comments are displayed, synchronizing with the video. As a result, a new evaluation method using the Internet has been achieved [3] [4] [5].

However, these methods have following problems: (i) since the student only checks the evaluation results after the teaching practice, it is difficult for them to recognize the points made by the evaluator correctly, (ii and iii) as the evaluator watches the teaching practice using the video, they may not appreciate the ambiance experienced during teaching. As a result, the evaluator may not evaluate teaching practice correctly.

Therefore we proposed our "real-time evaluation system" as a classification for a new evaluation method (iv). This system enables an evaluator to input a comment while watching a student's practice teaching in real time, and the student checks the comment using the video. As a result, the evaluator can accurately evaluate the teaching practice, and the student can correctly recognize the evaluation. In this paper, we report on the development and the results of our real-time evaluation system.

## 2. Development of a real time evaluation system

### 2.1 Outline of system

Figure 1 shows an outline of our real time evaluation system: (1) the evaluator inputs their impressions about the teaching practice using our system, (2) our system records the time when the evaluator inputs their comments, and (3) the student checks the comments while watching the video of their teaching practice.

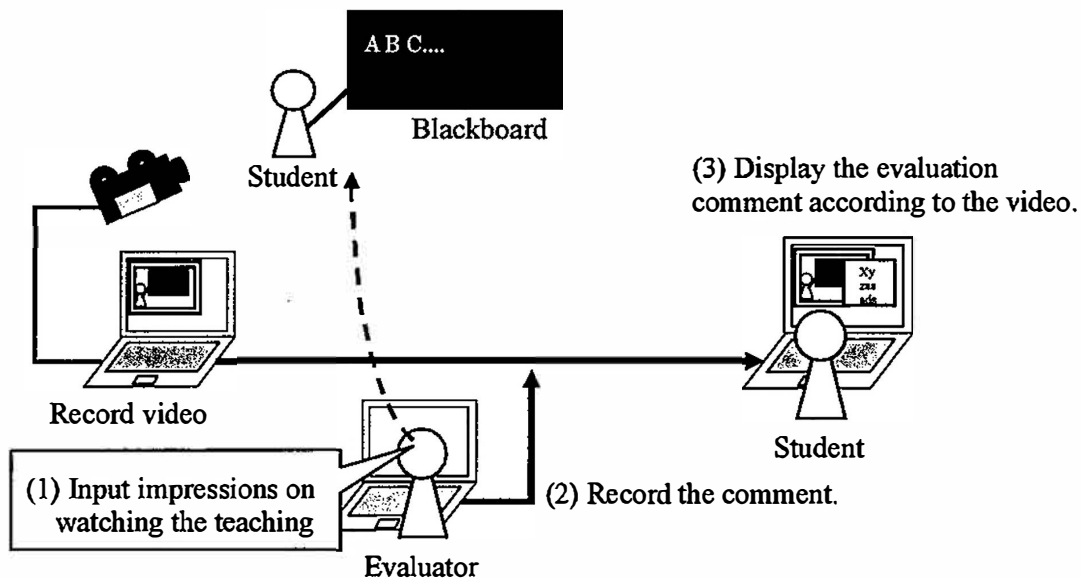


Figure 1. An outline of our system.

### 2.2 Design of the system

We had to design the following three applications to realize our system.

First, we designed an encode application for recording teaching practices that had the following functions.

- Encode images from a digital video camera to a video file (in wmv format).
- Record the start time encoded in a database.

Second, we designed an interface for evaluation that had the following functions to input a comment into an arbitrary scene while watching the teaching practice.

- Input comments in real time.
- Save the time that the comment was input into the database.

Third, we designed an interface for feedback that had the following functions to check the evaluation comments.

- Display the video of the teaching practice.
- Display the evaluation comments according to the video taken.

The system uses a client server model to achieve these functions using the Internet. This system records the start time of the encoding and inputting of evaluation, and using these times, this system specifies the scene of the video at which the evaluator inputted the comment. When the system plays the video, the evaluation comment is displayed at the time when the evaluator inputted it.

### 2.3 Development of the system

The real-time evaluation of our system was composed of three parts: (i) encode application, (ii) evaluation interface, and (iii) feedback interface. The system was developed in “Windows Server 2003, IIS and MySQL”.

(i) We developed the encode application using the Visual C# software package. The encode application encodes information from an image of the digital video camera to a video file (in wmv format) using the Windows media encoder library, and the application saves the start time of the encoding in a MySQL database using the MySQL connector library v.5.

(ii) We developed the evaluation interface using the PHP: Hypertext Preprocessor. The evaluator clicks either the “Comprehensible” or the “Incomprehensible” button during the teaching to evaluate if (Figure 2(a)), and the evaluation window is displayed when either button is clicked. Usually, the evaluator freely inputs the comment in the form shown in Figure 2(b). Taking into account that the teaching progresses while the evaluator is inputting comments, we added a selection form for evaluation in the interface (Figure 2(c)).

(iii) After the evaluation, the video and comments are displayed by the feedback interface. The feedback interface displays the comment in another window (Figure 3(a)), and the student or the speaker performs a self-evaluation (Figure 3(b)). In addition, this system provides a total of the number of comments per minute, and the feedback interface shows the results (Figure 3(c)).

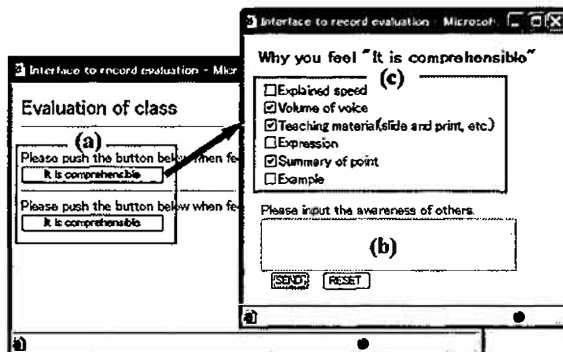


Figure 2. The evaluation interface.

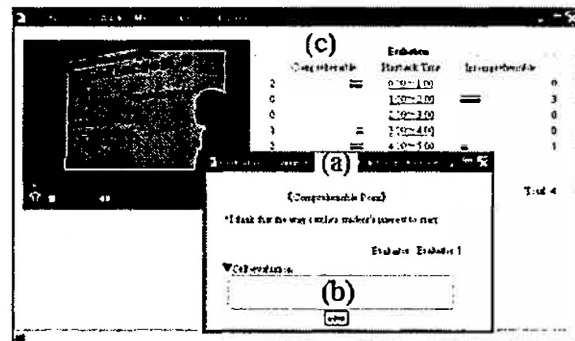


Figure 3. The feedback interface.

## 3. Practice and Evaluation of the system

### 3.1 Outline of the practice

We used this system to evaluate a student’s teaching practice of 10 minutes teaching per person. Four evaluators were used in the evaluation. We show the results of part of the evaluation comments in Table 1 as an example. The “Time” column in Table 1 denotes the time that a comment was input, and the “Evaluator” column denotes the name of the evaluator who inputted the comments.

Table 1. An example of the evaluation comments

Time	Content of evaluation comments	Evaluator
00:45	• I think that this way may attract student's interest at a time.	Evaluator 1
03:14	• I think that the students never get tired, because you mix "Explanation and problem".	Evaluator 2
04:09	• I think that the volume of your voice is heard well.	Evaluator 1

### 3.2 Evaluation of the system

We evaluated our system using a questionnaire. We commissioned the questionnaire of 24 students. The contents of questionnaire and the result were as follows.

*Question1:* What do you think about the method of inputting evaluation in real time?

*Answer1:* Favorable opinions were obtained from 77% of the students for the parameter “I was able to input feeling at a certain instant”. On the other hand, “I had no time to input the comments” received negative opinions from 23% of the students.

We consider that the evaluators are able to input the comments in real time. However, there is a problem of the time taken to input the evaluation. Therefore, in the future, we will improve the evaluation interface to shorten the input time of comments.

*Question2:* What do you think about the method of feedback evaluation using video?

*Answer2:* Favorable opinions were obtained from 90% of students for the parameter “The Point that I was able to check the scene that the evaluator had evaluated is good”. On the other hand, “I think that the part where the comment was displayed was difficult to watch” received answered negative opinions from 10% of students.

We confirm that this system is useful for students to receive the comments.

## 4. Conclusions

We have developed a real time evaluation system for microteaching. An evaluator is able to input comments into the system while watching a student practice teaching. After the teaching practice, the student is able to check the comments on a video recording. Tests using our system show that it is able to evaluate teaching.

Future work will involve (i) improvement of the selection type evaluation items, (ii) improvement of the interface to display the evaluation comments more effectively, and (iii) investigation into how our system can improve teaching.

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