

Effect on Lecturer and Students by Multimedia Lecture Archive System

MURAKAMI Masayuki
Research Center for
Multi-Media Education

Kyoto University
of Foreign Studies
JAPAN

masayuki@murakami-lab.org

NISHIGUCHI Satoshi
Faculty of law

Kyoto University

JAPAN

nishigu@mm.media.kyoto-u.ac.jp

KAMEDA Yoshinari
Institute of Engineering
Mechanics and Systems

University of Tsukuba

JAPAN

kameda@image.esys.tsukuba.ac.jp

MINOH Michihiko
Academic Center for
Computing and Media
Studies

Kyoto University

JAPAN

minoh@media.kyoto-u.ac.jp

Abstract – In this article, by the method of a questionnaire and interview, the effect on a lecturer and students is investigated when they are shot by the cameras during the lecture under our multimedia archive system. According to our analysis, the following things become clear. 1) Being shot by the cameras reduces students' concentration at the beginning, but it has nothing to do with the concentration gradually because they are used to attend such lectures. 2) It is important that the lecturer points at the screen showing the material appropriately for students to understand well under this multimedia archive system. 3) The lecturer gets used to this system and gradually gives a lecture with usual teaching methods, though he/she stressed by being shot by the cameras during the lecture at the beginning.

I. INTRODUCTION

The rapid advancement of the Information Technology(IT) has changed the education. E-Learning, such as distance learning[1] and WBT(Web Based Training), becomes very popular in higher education.

One of the asynchronous distance learning is to archive lectures. The advantage of it is to reduce the cost of making the e-learning contents, if it works efficiently. The archived lectures on WWW are delivered to students through the Internet so that the students can watch the lectures anytime and anywhere asynchronously. This expands the education opportunity not only for the students in universities but also the people in the society, for example, as the life-long learning.

There are two ways to record the lecture. One way is to prepare the lecture only for recording and transmitting, such as the Air University. The other way is to record the usual lectures by cameras and to broadcast the recorded lectures on WWW so that the students can watch later. In this paper, we focus on the latter because we have a lot of lectures in our campus. In this case, we are afraid of the bad psychological effect on the lecturer and students by being shot by the cameras during the lecture.

There are many previous works about asynchronous distance learning [2] [3][4]. However, there are few works on the psychological effects of the participants brought by recording of the lecture. In the future, it will increase to archive lectures and broadcast them through WWW. Therefore, it becomes important to investigate the effect on the participants of the lecture by being shot by the cameras in the lecture room during the lecture in order to improve the e-Learning system and the teaching methods.

In this paper, to investigate such effect, we analyse the questionnaires surveys and interviews to the participants in

the several lectures that are archived by our multimedia lecture archive system. Also, we describe the merit of the system, which can automatically record and broadcasting the lecture.

II. EXPERIMENT

II-1 System

The multimedia lecture archive system aims at obtaining all the kind of information that occurs during the lecture. Figure 1 shows the view of the classroom.

The devices in this system are the ultra-sonic sensor, CCD observation cameras and microphone array, and get information of the classroom. There are 8 shooting cameras set up in the classroom. 4 of them take the lecturer whereas the other 4 shooting cameras record students' behaviours based on this information. The system selects the best video among 8 videos.

The lecturer can use materials by the PowerPoint and electronic whiteboard when he/she gives a lecture. Timing of the flipping of the slides is also recorded. All the stroke information of the handwritings on the whiteboard is recorded with their time stamp.

The students can watch the recorded lecture any time after the lecture, which is an integrated figure of the lecturer, the students and the material information, as a multimedia movie on WWW. Figure 2 shows an example of the lecture archive on WWW.



Figure 1. A snapshot of the classroom

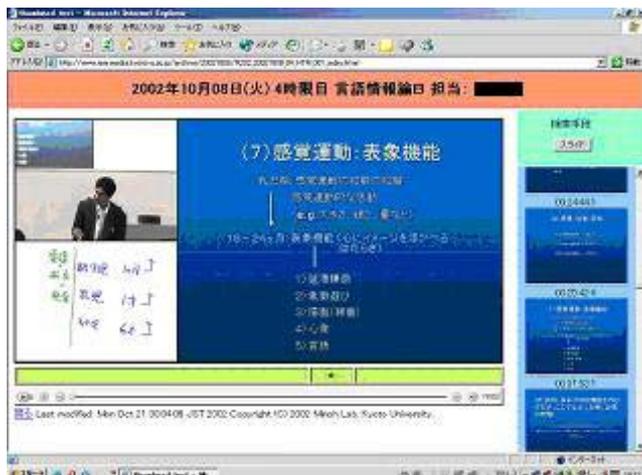


Figure 2. Lecture archive on WWW

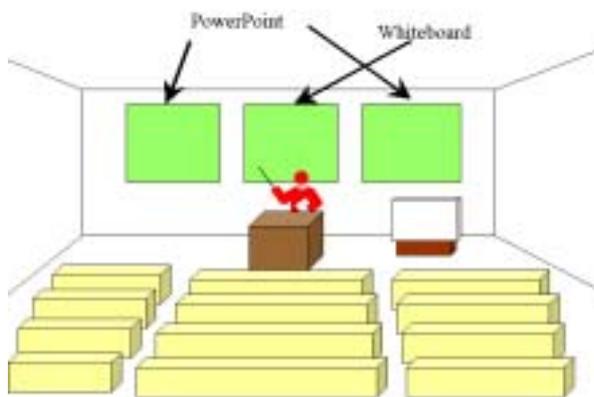


Figure 3. Classroom

II-2 Courses

By using this system, 6 courses were archived from October 2002 to January 2003. Each course consists of about 13 lectures. Table 1 shows the name, the department and the grade of the 6 courses.

Figure 3 depicts the figure of the classroom. There are 3 screens in the front of the classroom. The left and right screens show slides of PowerPoint, and the center screen displays what is drawn on the electrical whiteboard. Moreover, there are 2 screens behind the classroom so that the lecturer can check how he/she is shot by the cameras.

II-3 Methods

We did the questionnaires in order to find out the change in students' attitude under the circumstance of being shot by the cameras.

The students were asked to answer the questionnaire in an early stage (after the second or the third lecture) and at a later stage (after the last lecture) of the course.

There are three parts in the questionnaires. The first part consists of 8 questions that are on a 4-point scale with the rating as follows: 1(Strongly Disagree), 2(Disagree), 3(Agree) and 4(Strongly Agree). The second part of the questionnaire is a free space, where the students are asked to write comments about their feelings and the material.

The third part consists of 3 questions on this multimedia archive system on a 4-point scale with the rating. This part

is contained only in the last stage of the questionnaire. The contents of the questionnaire are shown in Figure 4.

We define the rating of question no.1 as "concentrations" and the rating of question no.2 as "understanding".

The results of the questionnaires are classified by the different stages as shown in Table 2.

In order to complement this survey of questionnaires, we interviewed three students for about 20 minutes. We asked them some questions: "What do you think about being recorded during the lecture?" "Is your attitude influenced during the course?" "What do you think about the material?" etc. And we asked some questions in response to their answers.

In addition, we interviewed 4 lecturers for about 1 hour: "What do you think about lecturing using the multimedia archive system", "What is the difference between this lecture and usual lecture?" etc.

III. RESULTS

In this section, we showed the results of statistical analysis for the questionnaire and interview as qualitative study. From the results of the analysis, we discussed the effect on the lecturer and students caused by the multimedia lecture system.

III-1 Means

First, the mean of the ratings for the 8 questions in the first part was calculated in each stage. The results are shown in Figure 4. By using t-test, the difference in the ratings between the stages was examined. Significant difference in Figure 4 is shown with an asterisk (*) before the question.

In addition, the mean of ratings for the 3 questions about this system was calculated, and the results are shown in Figure 4, too.

III-2 Regression analysis

Table.1 Lecture under this system

Lecture	Dept.	Grade
Multimedia	Eng	3
Pattern Recognition	Eng	3
Computer Architecture	Eng	2
Information Media	Liberal	1
Basic Physic chemistry B.	Liberal	1
Linguistic Information B.	Liberal	1

Table.2 Number of answers

Lecture	Early	Late
Multimedia	39	20
Pattern Recognition	42	36
Computer Architecture	34	34
Information Media	47	31
Basic Physic chemistry B.	46	26
Linguistic Information B.	69	82
Sum	277	229

Table 3 Regression coefficients about “concentration”

Question	Early	Late
3. Consciousness of being shot by camera	-.131	(-.064)
4. Feeling different	(.027)	(-.119)
5. Easy to see the screen	(.097)	.171
6. Appropriate to point at the screen	.269	.181
7. Easy to see the whiteboard	(-.080)	(-.103)
8. Appropriate to point at the whiteboard	.220	.290

Table 4 Regression coefficients about “understanding”

Question	Early	Late
3. Consciousness of being shot by camera	(-.007)	(.008)
4. Feeling different	.098	(-.066)
5. Easy to see the screen	.142	(.098)
6. Appropriate to point at the screen	.184	.310
7. Easy to see the whiteboard	(-.092)	(-.110)
8. Appropriate to point at the whiteboard	.203	.239

We did the multiple regression analysis to describe the change of students’ consciousness during the lecture. In this analysis, the dependent variables are “concentration” and “understanding”, and independent variables are the rating of the rest of the 6 questions.

The analysis by the standardized partial regression coefficients shown in Table 3 is on “concentration”, and in Table 4 is on “understanding”. If the standardized partial regression coefficients are not statistically significant ($p < 0.05$), we show them in parentheses.

As the result of the multiple regression analysis, the following relations are obtained.

“Concentration” is negatively related with the consciousness of being shot by the cameras at first, but this consciousness decreased gradually. And it is clear that “concentration” is positively related to the rating of the question about the material (PowerPoint on the screen and the electronic whiteboard).

It became clear that the feeling to be shot by the cameras gave a bad effect on “concentration” at first, but as the students got used to being shot by attending the same course, the effect of this consciousness is weakened. As the result, they paid more attention to the lecture itself.

On the other hand, “understanding” is positively related to the feeling different compared with the usual lecture at first. However, this effect of “feeling different” decreased drastically. Furthermore, the appropriate pointing at the material effects “understanding”, and the effect gets stronger as getting into the later stages.

In order to increase the level of “understanding”, it is important that the lecturer points at the screen showing the material appropriately. The students want the appropriate pointing to help them understand the contents of the course as the teaching material continues to be shown during the lecture.

Although the burden of the lecturer becomes heavier than usual, we indicate that the lecturer should pay attention to the appropriate pointing of the material. We can say that this point is important for the lecture archive.

III-3 Interview students

Based on the result of the analysis of the questionnaire, we interviewed 3 students, who agreed to conduct the survey, for about 20 minutes individually.

All of the 3 students were conscious of being shot by the cameras at first.

“I felt the strain a little, because I was worried that I was the only one being shot by the camera.”

In addition, 2 students became less stress eventually, but the other one student continued to feel being shot by the cameras.

The 2 students said that they were concerned about how the video was shown in the behind screen for the lecturer. Also, the devices in the classroom had impact on the students. *“I’m impressed by the classroom where there were many devices. I felt that ‘It is in the classroom of the media center where I receive the next lecture’ ”*

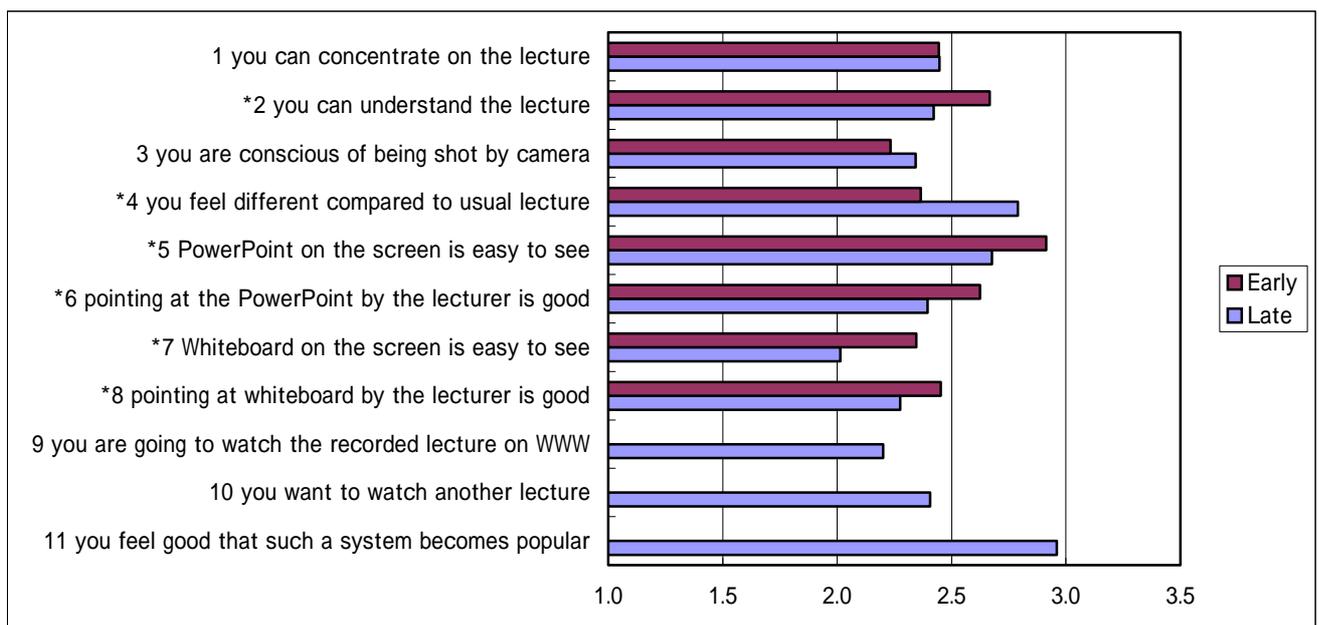


Figure 4. Mean of question

We asked a question based on this response: "What do you think of human being recorded of the lecture by the cameras?"

"Perhaps, I think the automatic way is better. If humans shoot, I may feel more stressed."

They feel better to be shot by the automatic system than by human and they gave good evaluation to the lecture archive system from the result of question no.11 in Figure 4.

With regard to the material, they had few comments showing on the screen, but there were a lot of opinions on the electrical whiteboard.

"Sometimes the letter written on the whiteboard couldn't be shown on the screen, so I had to see the whiteboard directly. I tried to sit where I was easy to watch the whiteboard."

"At first I watched only the screen, but sometimes it didn't function perfectly, so I watched the screen and the whiteboard with the same frequency to recognize the letter on the whiteboard."

It is known that they managed to get the information on the whiteboard. These results show the importance of the material as described in III-2.

III-4 Interview Lecturer

We interviewed 4 lecturers and got the following opinion. They felt strong responsibility by recording the lecture.

"Although I was not concerned about recording the lecture in real time, I felt responsible when I was aware that the students could watch the lecture later."

"In October, I paid more attention to the system than to conduct the lecture. I became comfortable in January, so that I could give the lecture smoothly even under the system."

Hence, I asked them the following question: "Did you change somewhat your teaching methods?" One of answers was that *"No, I didn't change consciously this time."* "I tried to think of proper teaching methods for this system."

At first, the lecturer felt the stress and responsibility under this multimedia archive system. As the lecturers became used to the circumstance, they could give a lecture as usual.

Concerning the question on the "difference from usual lecture", one of the lecturers answered as the following: *"I think that the questions from students in the lecture were less than the last year."*

IV. CONCLUSION

In this paper, we reported our analysis of the questionnaires surveys and interviews so that we could clarify how the lecturer and students are influenced under the multimedia archive system.

The following results are obtained from our analysis:

- It becomes clear that being shot by the cameras has a negative effect on "concentration" at first, but the effect decreased gradually as the participants are getting used to have the lecture.
- "Understanding" has positive relation with "feeling different compared with usual lecture" at the beginning. However, this effect is decreased drastically.
- It is very important that the lecturer points at the screen showing the material appropriately for the students to understand well.
- The lecturer felt stress and responsible under this multimedia archive system at first, but as the lecturers got used to the circumstance, they could give a lecture as usual.

For future work, the following things are considered.

From the results of III-1, the evaluation about "understanding" and the material was getting worse in the later stage. The reason may not be only the effect of recording the lecture but also the difficulty of the course at the later stage, so we cannot identify the factor. We have a need to compare this result with that of the usual lecture.

We need to modify this system, especially the electric whiteboard on the basis of the result of this research. Moreover, we could discuss proper teaching methods under such a system.

Reference

- [1] Murakami, M., Yagi, K., Kakusho, K., Minoh, M. "Evaluation of Distance Learning Course shared by UCLA and Kyoto University", ITHET2001
- [2] Mizokami, S., Taguchi, M., Murakami, M., and Levis, M.R. "Teaching on the interactive distance lecture between universities: Through the UCLA and Kyoto University joint-project", IV International Congress of Education
- [3] Okawa, K. Kato, A. Gast, G. Atarashi, R. Toyobe, Y. L.H.Landweber, Murai, J. "Global collaboration for the joint University course on the next generation Internet", INET2000, 2000
- [4] Hiltz, S.R., Coopola, N., Rotter, N. and Turrof, M., "Measuring the Importance of Collaborative Learning for the Effectiveness of ALN: A Multi-Measure, Multi-Method Approach", ALN Journal, Vol.4, Issue 2, 2000