The First Step for E-learning by Combination of Handheld Device and Course Management System

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Abstract. e-learning has become important with the progress of education digitization. It is very important for us to develop the educational contents for e-learning materials. However, it has a quite different, but very important factor. That is the equality of opportunity for education. As for e-learning, students must have accesses to the education materials completely equally. However, it is not so easy for them to have the complete equality by having at least one computer per student in real life. It depends on financial situations of students' families and also on the financial situations of the educational organizations. Apart from PC, handheld cell phones could be used instead of mobile PCs to some extent. In this study, a handheld cell phone was picked up and used to have accesses to a course management system (CMS) based on Moodle instead of PCs. And the usability was analyzed through a questionnaire and confirmed as the first step for e-learning class in the future.

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1   INTRODUCTION

Recently, e-learning has become important from the background where the digitization of education is progressing. Many educational materials are developed and also in our Suzuka National College of Technology (SNCT), two e-learning courses were established for advanced course students (a special Bachelor course in the National Colleges of Technology system, Japan) and are now distributed to different higher education organizations of engineering. On the other hand, a course management system (CMS) based on Moodle has been introduced in our college and lots of faculties are trying to use the system for their classes. However, most of our students have accesses to Internet through the desktop terminals installed in our college's information and processing center. When we come to think about advantages of e-learning, the utilization form would not be always appropriate, since students should study and learn at any place and any time for e-learning. To diffuse and enlarge the use of -learning in the future, such a utilization form would have a certain limitation soon or later. Even from a general classroom or from some places on campus, students should have accesses to Internet to get the appropriate information and we need such an environment at this point. Some faculties insist that we should provide all of our students a lap top computer for each. However, it would lead to the problem, in addition to financial ones, how students should use their own desk in the classrooms properly. The size should be limited to some extent for their suitable learning environment.

The size and the weight of the handheld device for this project was almost the same with typical electronic dictionaries and would be usable properly on the students' desk in the classroom. When the Wi-Fi system would be applied to the handheld device, a lot of information could be provided to the students via the device. The required information would be prepared by the college authority. In the light of that, the burden of students would be not so heavy. Using the device and system, the administration section of our college could call for any students, as need arises. And it might be used as student handbook as well as electronic dictionaries to some extent. The handheld device might open the door to new phases for e-learning well beyond our current estimation. Therefore, we used a handheld device for questionnaire activities about a class as the first step for the future e-learning classes and investigated the problems, usability etc.

2   EXPERIMENTAL

The handheld device used for this study was a miniature terminal for a Wi-Fi network called W-ZERO3. Fifty apparatuses were prepared in advance and distributed to the students joining a class in charge of which one of us authors were for fifth graders in

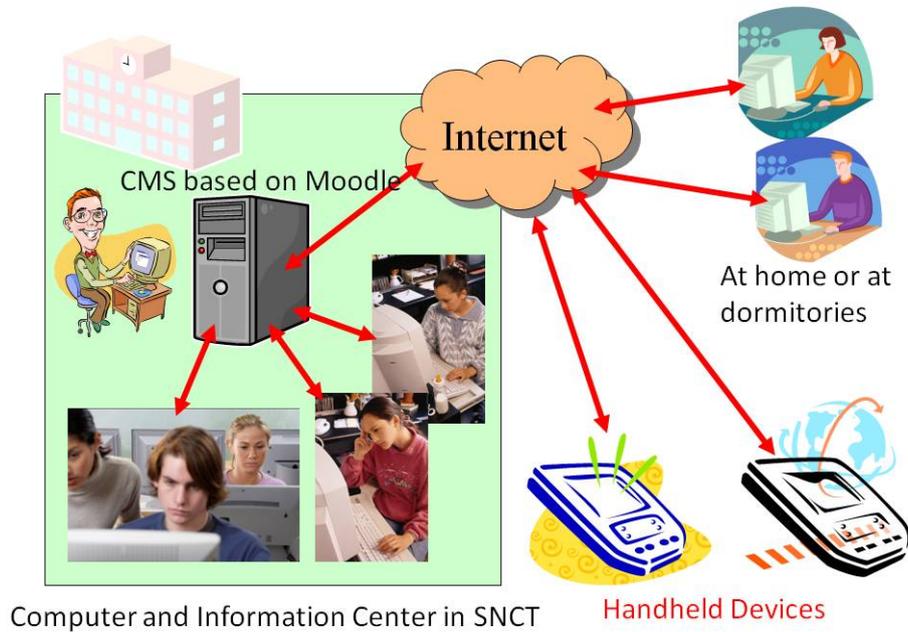the department of materials science and engineering.   The name of the class was

Fig.1 Schematic illustration of this project.

Industrial Engineering (IE) held for the first semester (15 weeks in the second half of the school year, 2009) and the number of credit was just one. Mostly the teacher taught the class students offline (in the traditional face-to-face style). And at the final stage of the class, print questionnaires were provided to the students with the handheld terminals.   Then the teacher explained to them about how to use the handheld device, and the students answered the questionnaires by the device. The contents of the questionnaires were composed of five closed-ended questions and the five   answers   for   each   as   follows.
Question 1: What did you feel about the questionnaires activities based on the handheld   device,   being   compared   with   that   on   usual   print   ones?
Answers 1: ①Very easy, ②Pretty easy, ③Neutral, ④a little inconvenient, ⑤very inconvenient
Question 2: We presume that you had some difficulty to handle this procedure. However, what would you feel about the usage, if you would be very familiar to the handling   in   advance?
Answers 2: ①Being familiar to the device in advance, I think it would be very convenient. ②Being familiar to the device in advance, I think it would be pretty convenient. ③Neutral, ④Even though I would be in advance familiar to the device, I would feel it a little bit inconvenient. ⑤Even though I would be in advance familiar to the device, I   would   feel   it   very   inconvenient.

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Question 3: What do you think about the usage of handheld devices for the face-to-face class?

Answers 3: ①Very enjoyable, ②pretty enjoyable, ③Neutral, ④little bit unenjoyable, ⑤very unenjoyable

Question 4: What did you feel about the handling of Moodle by the handheld device?

Answers 4: ①Very easily, ②Pretty Easy, ③Neutral, ④a little difficult, ⑤Very difficult

Question 5: What do you think is the most attractive advantage of Moddle by the handheld device for you?

Answers 5: ①I can utilize it at any time and any place. ②I don't have to worry about to miss the submission of any reports, leaving them at my home. ③I can convey the notification messages and reconfirm for sure. ④I can feel free to ask teachers any questions.

Students entered the CMS based on Moodle run by SNCT, chose the course of IE, and selected their answers from five choices. The answers were collected, analyzed and displayed by the Moodle-driven CMS, and the results were discussed by the authors.

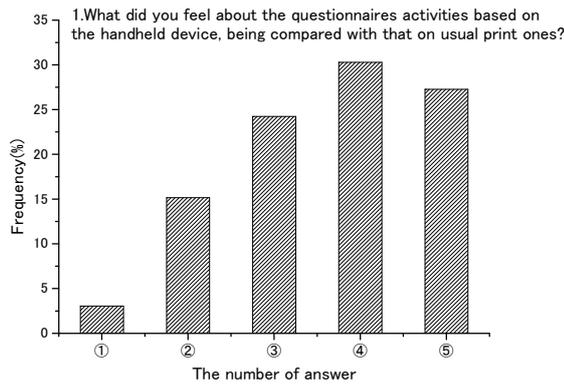The system for this project was illustrated in Fig.1 schematically.

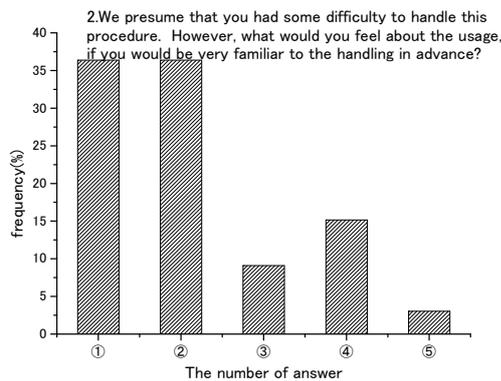Fig.2   Question 1 and the answers.

3   RESULTS AND DISCUSSION

Fig.2 shows the answers for the question 1. These results indicate that there were many students feeling the operation of handheld device difficult. As already described, the operation was explained to the students in a short time just before the activity. Therefore, the learning level was scattered among students. And we could conclude that it was not so enough as a whole. Actually, many students assumed that the system with the handheld device would be very usable after the

Fig.3   Question 2 and the answers.

proper learning for the usage, according to the results in Fig.3.

Fig.4 shows the result s for the question 3, if the students could enjoy the operation of handheld device or not. If the two answers, ①Very enjoyable, ②pretty enjoyable, would be positive, you can see more than half students enjoyed the activity. Recently, there are pretty many students in our college who used cell phones in secret during classes. We teachers think that the tendency would be very alarming. However, it obviously suggests that the incorporation of handheld devices into one of the educational tools in classrooms would work well for youngsters. Fig.4 seems to support the possibility.

Fig.5 shows the results for the question about the usability of Moodle through handheld devices. The answers were scattered and did not indicate any definite tendencies. In our college, we have encouraged faculties and students to utilize the CMS based on Moodle so far. However, the utilization ratio is growing at a sluggish pace below our expectation. The tendency might be reflected on the answers.

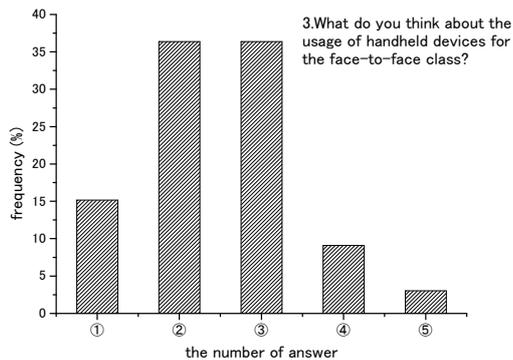From all of these results, the difficulty for the utilization of handheld devices on one hand was clarified to some extent as well as the enjoyment on the other hand. At that point, what did students feel about the advantage and attractiveness for the utilization of handheld devices for the class? Fig.6 shows the answers for the question. The attractiveness of handheld devices in the class activity can be classified into two categories. The first one is the possibility of activity at any time and any place. And the second is that they don't have to worry about the submission of the print reports which they might forget to bring to our college.
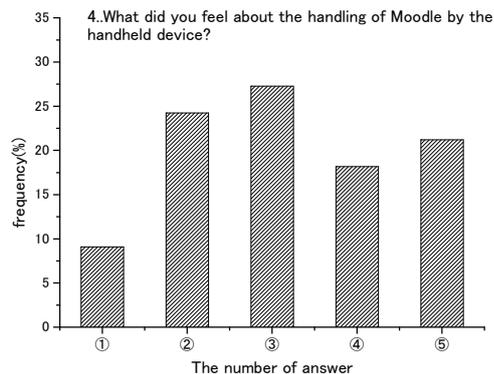
Fig.4 Question 3 and the answers.

For the current project, the handheld devices were used only for the questionnaire activity as the first step for e-learning facility. However, the next step should be the application to the actual e-learning processes. Then the attractiveness and advantage for the usage of handheld devices should be taken into account. Even though the questionnaire results did

Fig.5 Question 4 and the answers.

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not reflect the teachers' convenience, the usage of handheld devices and CMS gave us teachers high performance and efficiency, being compared with the class through usual print based procedures.

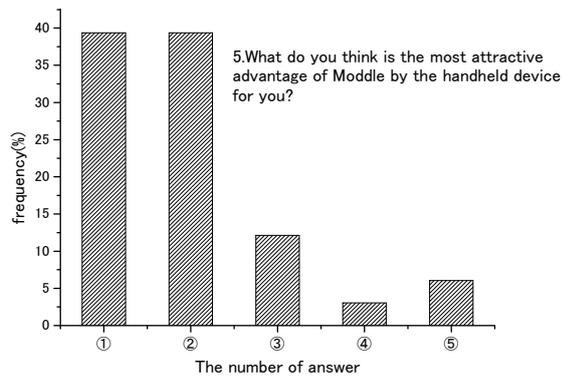5.What do you think is the most attractive advantage of Moddle by the handheld device for you?

Fig.6 Question 5 and the answers.

4   CONCLUSIONS

As the first step for the future e-learning by the combination of handheld devices and CMS based on Moodle, the handheld device was applied to the questionnaires activity after a series of traditional face-to-face learning. The results suggest that students were excited with the facilities, however they felt difficulty for the usage on the other hand. According to the results, a new development for the next step should follow on full scale in the near future.