Prototype Development of Integrated Class Assistance Application Using Smart Phone

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Abstract - Recently, Smart phone spread mainly on 20s. The current smart phone has very high functionality at the same level as a mobile computer. We think that it has high demand to use the high-performance smart phone for learning assistance and class assistance. In addition, we think that the development of the education assistance system has very high demand. However, the smart phone use by the class causes "Inappropriate use" of the student. For this reason, the fullscale research and development do not yet exist. In this research pushes forward development of "Integrative Education Environmental System" to use a smart phone by a class while limiting "Inappropriate use" of the smart phone. In this paper, we design the contents of application for classes and we development prototype system in "Integrative Education Environmental System".

Keywords: Smart phone; Class assistance; Integrative Education Environmental System; application

1 Introduction

In late years, a cellular phone is the most familiar electronic device. The diffusion rate continues increasing now. In this background, there is the development of cellular phone called a "Smart phone".

The smart phone is development on the basis of the function of a computer. The smart phone has a personal digital assistant function as a big characteristic and enables operation by using touch panel. In addition, the recent smart phone has very high functionality at the same level as a mobile computer, and convenience is very high. For these reasons, the smart phone spreads mainly on businessman and university student. We thought that there was very high demand and functionality for the development of education assistance systems such as universities using smart phone.

However, there is a very big problem with education assistance using smart phone. It is a problem of "Inappropriate use". "Inappropriate use" is network game or "Twitter" that are unrelated to a class. In other words the class use of the smart phone causes "Inappropriate use" using the function of the smart phone. In addition, when we assume a class using a smart phone, all students use a smart phone. Out of these, it is very difficult that a teacher finds "Inappropriate use" and warns. From these reasons, it is very difficult for the class use of the smart phone to realize it. Furthermore, the education assistance system limiting "Inappropriate use" does not yet exist.

2 Purpose

Recently, the realization of the education assistance using smart phone is very difficult. As a cause, there is a problem of "Inappropriate use". Therefore, in this research, we aim at the development of "Integrative Education Environmental System". "Integrative Education Environmental System" is an environmental system enabling the class use of the smart phone while limiting "Inappropriate use".

In this research, we build "Integrative Education Environmental System" by three following structure.

(1) Limit of the cellular radio wave of the smart phone

(2) The wireless LAN that set connection restrictions of the class-limited

(3) Development of the class contents of application

In this structure (1), we limit the cellular radio wave of the smart phone in the classroom. In this structure, we assume that we use a device limiting a cellular radio wave. By this device, we limit the cellular radio wave state of the smart phone. In other words, we limits "communication using a cellular radio wave".

In this structure (2), we use the wireless LAN that set connection restrictions of the class-limited. In this structure, we place wireless LAN only for the class use in the classroom. The smart phone usually has two communication methods, "Communication method using a cellular radio wave" and "Communication method using WiFi function". In the situation that "Communication method using a cellular radio wave" is confined to by structure of (1), "Communication method using WiFi function" is possible. In this research, we use this structure. Furthermore, the wireless LAN connection of the class-limited uses a proxy server. By proxy server, we make only an address and domain to use by a class accessible. With this structure, we build environment "The communication using cellular radio wave is impossible. The student can be connected to the wireless LAN place in the classroom by WiFi function. However, what can be connected only as for the address and domain of the class use".

In structure (3), we develop the contents of application for classes. In this research, we build environment "The communication using cellular radio wave is impossible. The student can be connected to the wireless LAN installed in the classroom by WiFi function. However, what can be connected only as for the address or domain of the class use" by structure (1) and structure (2). Next, we implement contents of application for classes in "Address for exclusive use of the class use". In addition, we develop the contents of application for classes of this research as web application. By this method, we solve a problem to occur from the difference in Operating System of the smart phone.

In these structures, we build "Integrative Education Environmental System" enabling education assistance using a smart phone while limiting "Inappropriate use".

Under the present conditions, we can build the environment to limit "Inappropriate use". However, the contents of application for classes have only a minimum system. Therefore, in this paper, we design the interface of the contents of application for classes to use it by "Integrative Education Environmental System". And we develop a prototype system of the contents of application for classes.

3 Design of the Contents Application for Classes

"Integrative Education Environmental System" of this research, we aim for use enabling a class only by a smart phone and system in the future. Therefore we think that various functions are necessary to manage a class. So we design the interface of the contents of application for classes. In addition, we develop a prototype system of the contents of application for classes. Furthermore, in this research, we are referring to various researches, in order to develop an application system required for class. [1][2][3][4][5][6]

3.1 Transmission of the Attendance Information

By the general class, the confirmation of the student attendance is necessary. For example, in general class, there are usually methods to distribute exclusive paper to for confirmation of the student attendance. In this research, we think about a method to attract the states of the student attendance from application with a smart phone. In addition, the confirmation of the student attendance has a problem. It is a problem of the "substitute attendance". As a method to prevent substitute attendance, this application assumes the transmission of the attendance only once. Therefore, this application displays a page to confirm information when a student transmits attendance information. By this method, we prevent false transmission of the attendance information and substitute attendance. We show a summary of this interface that we designed in figure 1.



Figure 1. summary of "Transmission of the attendance information"

3.2 Acquisition of the Teaching Materials

In a class, one of important factor is teaching materials. In the case of general class, there are textbook and print document that a teacher made teaching materials. In late years, the PowerPoint document that a teacher made is mainstream. This application system makes it possible to push forward a class smoothly by acquiring the teaching materials from a smart phone. In other words, student can use the smart phone as a textbook. This interface sets up the electronic teaching materials of the Portable Document Format (PDF) file. We think about the interface that student tap PDF icon can download the teaching materials. We show a summary of this interface in figure 2.



Figure 2. Summary of "Acquisition of the teaching materials"

3.3 Contribution and Share of the Question

In a recent class of Japan, there is very few "Remark of the student" that student asks a teacher a question during class. However, it is not a meaning that there is not a question that there are few remarks of the student. Rather we think that there are many students "I want to remark, but cannot do it". Therefore we thought about the application system that a teacher could easily the question of the class. In addition, anyone can look the past questions and answers. By this application system, we enable very smooth class use. We show a summary of "Contribution of the question" in figure 3, and we show a summary of "Share of the question and answer" in figure 4.



Figure 3. Summary of "Contribution of the question"



Figure 4. Summary of "Share of the question"

3.4 Question and Questionnaire form a Teacher

When we assume a general class, there is a scene "Question from a student to a teacher" and "Question from a teacher to a student". In the scene of "Question form a teacher to a student", there are very few students answering the question of the teacher. We thought about the application system that student could easily answer by such a question and questionnaire. By this application system, we enable smoother class use. In this interface, we assume it the specifications that the student taps "Yes" and "No" button and can easily answer. We show a summary of this application system in figure 5.



Figure 5. Summary of "Question and questionnaire from a teacher"

3.5 Submission of the Subject

In the class, there is situation to submit a simple subject to at the time of the class end. We thought about the application system that can submit such a simple subject to a student using smart phone. By this application system, we can simplify the collection of the answer to subject. In addition, we can store the answer to subject as electronic data. We show a summary of this application system in figure 6.



Figure 6. Summary of "Submission of the subject"

3.6 Discussion Space

At the current Japanese university, a student often surpasses 100 students for one class. Therefore it is very difficult to carry out "active learning" in the class. At the Japanese university, it is difficult to carry out a discussion and debate by a large-scale class. For this reason, the class form that a teacher holds is common now. By this application system, with "Integrative Education Environmental System", even a large-scale class enables large-scale active learning using smart phone. In this application system, we think about the function such as the chat to enable the discussion between students. We show a summary of this interface in figure 7.



Figure 7. Summary of "Discussion space"

3.7 Explanation of the Teacher

We performed a very simple subject of an experiment in "Integrative Education Environmental System". In the case of this subject of an experiment, there was an opinion from a student "I concentrated on the operation of the smart phone and have missed the explanation of the teacher". In reference to such an opinion, we thought that a function to list the explanation of the class was necessary. We show a summary of this interface in figure 8.



Figure 8. Summary of "Explanation of the teacher"

3.8 Glossary

In "Integrative Education Environmental System" to develop in this research, we use a method to limit the communication environment of the smart phone, and to limit "Inappropriate use". Therefore, student cannot be "I check that I do not understand it on the Internet". For example, there is the risk such as "I don't understand the meaning of a word and term. But I'm not checked". Therefore we thought that glossary about the class was necessary. We show the interface of this function in figure 9.



Figure 9. Summary of "Glossary"

4 Development Prototype of the Contents of Application for Classes

In this paper, we develop a prototype application of the contents of application for classes based on the interface that we designed. In this chapter, we describe an operation example to use prototype application.

4.1 Transmission of the Attendance Information

The transmission of the student attendance needs the following operation.

- 1. Input a student id number and a full name into an input form
- 2. Tap a transmission button and move to the confirmation page
- 3. Tap a transmission button once again

By this operation, the student can transmit the student attendance. We show this application in figure 10.



Figure 10. "Transmission of the attendance information"

4.2 Acquisition of the Teaching Materials

The acquisition of the teaching materials needs the following operation.

- 1. Confirm that subtitle of the class and the PDF icon are installed
- 2. The teaching materials tap the PDF icon of the class
- 3. The downloading of the teaching materials is started

By this operation, the student can acquire the teaching materials of the class using smart phone. We show this application in figure 11.



Figure 11. "Acquisition of the teaching materials"

4.3 Contribution and Share of the Question

At first, the contribution of the question needs the following operation.

- 1. Input a question
- 2. The teaching materials tap the PDF icon of the class
- 3. The downloading of the teaching materials is started

By this operation, student can contribute the question for the class. We show this application in figure 12.

Next, the share of the question needs the following operation.

- 1. Tap the "Past Log" button of the lower part
- 2. Because the date of the class is displayed, student tap the date when student want to read it

3. Because a past question and answer are displayed, student tap it and read it

By this operation, anyone can read a past questions and answers. We show this application in figure 13.

I don't understand, 18 May 2014	Past Log
May 2014	◆Lecture No.1[15 May.2014]
	◆Lecture No.2[17 May.2014]
sample question 14 May 2014	◆Lecture No.3[19 May.2014]
May.2014	◆Lecture No.4[20 May.2014]
Question Title	Back
Message	
Submit Past Log	
▲ = ⊕	* * = B

Figure 12. "Contribution of the question" (Left)

Figure 13. "Share of the question" (Right)

4.4 Question and Questionnaire From a Teacher

Question and Questionnaire from a teacher need the following operation

- 1. Because a question and questionnaire from a teacher are displayed by the center of page, student confirm contents
- 2. Because a "Yes" and "No" button are installed in the lower part, student tap a button of thinking that it is a correct answer

By this operation, the student can easily answer it by a question and questionnaire from a teacher. We show this application in figure 14.



Figure 14. "Question and questionnaire form a teacher"

4.5 Submission of the Subject

The submission of the subject needs the following operation.

- 1. Because the contents of the subject are displayed by the upper part, student confirm it
- 2. Student input the answer to subject into an input form installed in the center
- 3. Student tap "Submit" button of the lower part
- 4. Because a confirmation screen is displayed, student tap "Submit" button once again

By this operation, the student can submit a subject using smart phone. We show this application in figure 15.



Figure 15. "Submission of the subject"

4.6 Discussion Space

The discussion space needs the following operation.

- 1. Student input the remark that student want to write in at an input form of the upper part
- 2. A remark in added to the discussion space of the lower part when student tap a "Submit" button

By this operation, a large-scale discussion using a smart phone is possible. We show this application in figure 16.

4.7 Explanation of the Teacher

By the explanation of the teacher, the explanation of the teacher is listed in the whole page. The student can evade the problem that misses the explanation of the teacher by watching this explanation. We show this application in figure 17.



Figure 16. "Discussion space"



Figure 17. "Explanation of the teacher"

4.8 Glossary

The glossary needs the following operation.

- 1. On the page, a term connected with a class is display with a list
- 2. When student tap a term, application move to the page where the meaning of the term is listed in

By this operation, student can confirm the meaning of the term of the class without using the Internet. We show this application in figure 18.



Figure 18. "Glossary"

5 Conclusion

In this research, it is construction of "Integrative Education Environmental System" that enables class use on the smart phone while limiting "Inappropriate use" as the final aim. In this paper, as one of the important structure of "Integrative Education Environmental System", we developed a design of the contents of application for classes and prototype application.

However, we only developed prototype application now. So, in the future of this research, we want to push forward improvement based on this prototype application.

As the future of this research, as first we think about the enforcement of the subject of an experiment. As an experiment method, we really have a student use the prototype application that we developed in this paper by a class. Thereafter, we collect opinions from a student and perform addition and deletion of the function of the application. We repeat such a subject of an experiment, we want to complete the application that it is easy to use for student. In addition, with application, we want to aim at the completion of "Integrative Education Environmental System".

6 References

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