

# p-HInT: Interactive Educational environment for improving large-scale lecture with mobile game terminals

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**Abstract:** We have developed an interactive educational environment called “p-HInT”. Purpose of the p-HInT is improvement of speech style lectures with 200 or more attendees at non-computer classrooms. A most feature of the p-HInT is usage of mobile game terminal NINTENDO DS with Opera browser. The p-HInT has main two functions: (1)an attendant list with sit down position in a classroom, (2) test in hand-written style. By using the p-HInT with DSs, because teachers can quickly grasp attendees’ understanding, the teachers can improve then and there the lecture. As a result of adapting lecture on the regular curriculum, we confirmed effectiveness and potential of the p-HInT.

**Keywords:** Interactive education, large-scale lecture, mobile game terminals, real-time results of tests,

## Introduction

In university education, speech style lecture is usual. Teachers tell their knowledge with displaying materials using various equipments such as white boards, projectors, and videos. Students acquire knowledge from teachers’ speech. That is, the teacher does a one-sided lecture. Especially, when the number of attendee is large, teachers have no choice but to do such a one-sided lecture. For example, the number of attendees sometimes reaches two hundreds in a lecture of liberal arts course. A teacher does a lecture at a large-scale lecture room like a hall. In this case, the teachers cannot grasp not only understanding rates of the attendees but also even names of the attendees. Moreover, it is difficult for teachers to call the roll because it takes much time to call each name of two hundreds attendees. In such situation, of course, it is also difficult to do paper tests to confirm the attendees’ understanding rates. If teachers do paper tests in the large-scale lecture, it will consume 10 minutes to distribute the test papers, and it will need 10 minutes to collect the test papers. Furthermore, teachers cannot immediately grasp the attendees’ understanding then and there, because teachers take two or three days to score the two hundreds test papers. Teachers do lectures with groping while judging attendees’ understanding rates from a look of the attendees. Although everyone knows inefficiency of such lectures, teachers have no choice but to do the speech style lectures because of large number of attendees.

Therefore, we propose a new interactive educational environment for large-scale lectures. We call the environment “p-HInT(portable Hannan Internet education Tool)”. The p-HInT system consists of server computers and mobile game terminals. The mobile game terminal is NINTENDO DS[1] (from here, we call it “DS”). The p-HInT system including



## 2. The p-HInT system

### 2.1 Aim

An aim of the p-HInT system is improvement of large-scale lectures of two hundreds or more attendees at non-computer classrooms in university education. We improve speech style lectures into interactive style lecture. Interactive style lecture means that teachers tell their knowledge while the teachers grasp attendees' understanding rates. Even if the number of attendee is two hundreds or more, the teachers can easily communicate with each attendee through the p-HInT system.

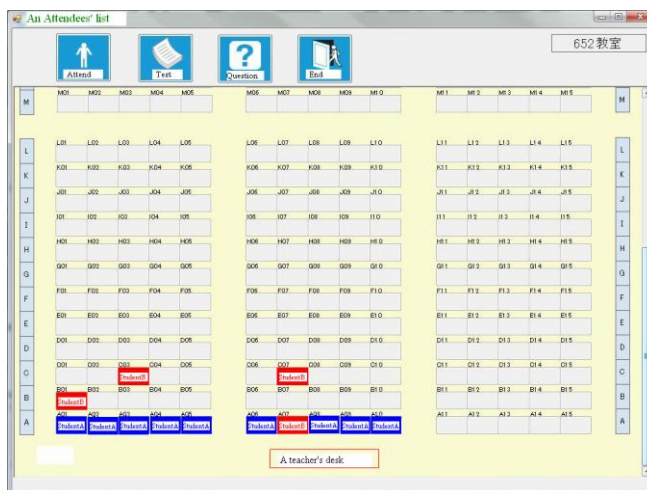
Figure 1 shows a usage image of the p-HInT at a large-scale lecture. Each attendee brings DS to a lecture. At the beginning of the lecture, the attendee does login to the p-HInT through DS. The p-HInT records the attendee name and sit-down position in the classroom. The p-HInT generates an attendees' list with sit-down position (See "Display of an attendees' list" of Figure 1). In addition, through DSs, a teacher can do tests at the lecture. The p-HInT is useful at non-computer classroom. Especially, the p-HInT is valuable at large-scale classroom like a hall.

### 2.2 A attendees' list with sit-down position

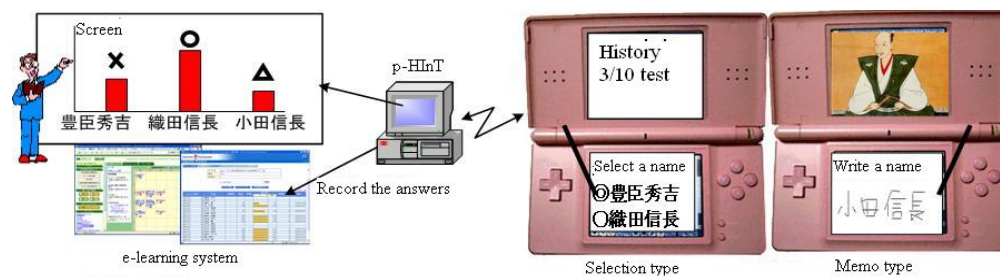
Figure 2 shows a capture image of a teacher's desktop computer. The computer displays an attendees' list with sit-down position at a classroom. This classroom capacity is 400 attendees. Of course, this classroom is not a computer room. Figure 2 is an example of the list in when thirteen attendees are sit down. Each rectangle means each attendee's sit-down position. A blue frame rectangle shows normal attendee's name. A red frame rectangle means non-normal attendee's name. For example, the attendee was late for the lecture, or, the attendee is playing games of NINTENDO DS without seeing the lecture's materials. When a teacher clicks the "Attend" button on Figure 2, the teacher can easily call the roll even if the number of attendees is two hundreds and more. In addition, the names in the rectangles of Figure 2 are connected to Database of student information. Therefore, if a teacher clicks a name of the rectangle, he/she can see the student profile such as student ID, a face photograph, and attendance state of the past lectures. The attendees' list is useful for not only attendance management but also interactive education. In university, a student does not always wear a name tag. It is difficult for teachers to keep all student names in mind. However, efficiency of education when a teacher directly calls student name is better than when a teacher does not call student name. For example, attention call such as "Does John understand?" is better than attention call such as "Does everyone understand?". It is an efficient way to turn the student attention to the teacher.

### 2.3 A tests and results

Figure 3 shows images of tests on DS. A teacher can easily set questions to the p-HInT on a teachers' desktop computer at a classroom. During a lecture, a teacher can quickly make a



**Figure 2 An attendees' list with sit-down position at a classroom**



**Figure 3 Tests and results through DS on the p-HInT system**

question of p-HInT in only a few steps. The questions can be performed by both selection type and input handwritten-characters type (memo type). When a question is selection type, an attendee clicks a word on the touch panel of DS using a stylus pen (See an example of selection of Figure 3). When a question is memo type, an attendee directly draws Japanese characters into the touch panel of DS using a stylus pen. That is, an attendee can answer in handwritten like paper tests using a pencil. The handwritten answering is a most valuable feature in the p-HInT. The handwritten is based on a function of handwritten character recognition of DS. Of course, a general e-learning computer system can not support the handwritten answering. Through the handwritten answering like paper tests, teachers can educate students to write accurate spelling of Japanese. In addition, the answers can be quickly collected, are summed up to the p-HInT. Of course, the accumulated answers and scores are available to decide grades of the lecture.

### 3. Lectures using the p-HInT system

From April of 2008, lectures of four subjects on the regular curriculum have been adapted to the p-HInT system. The four subjects are “Introduction IT(A)”, “Introduction IT(B)”, “Introduction Database”, “Introduction Network”. These subjects are basically for the first-year students in our university. The numbers of attendees are respectively 162, 179, 102, and 41. The teachers give these lectures at normal classrooms, not-computer rooms. Figure 4 shows a look of a lecture of the subjects. Because the series of the lectures continues until July of 2008, all tests and attendance confirmation have not yet finished.

### 4. Discussion

#### 4.1 effectiveness of the p-HInT

Lectures of university education are far different from high school or elementary school education. It means mass education. Various students attend university lectures. Students have different background knowledge, different ages, and different specialized fields. Members of lectures are not fixed at every lecture. Therefore, it is difficult to remember students' names and students' faces. In addition, almost lectures adapt students' free-sit down style. In such case, the attendees' list with sit-down position of the p-HInT(Figure 2) is valuable. Even if two hundreds or more students sit down by free-sit down style, teachers



**Figure 4 A look of lectures of the four subjects of the regular curriculum**

can grasp each student name. Grasping students' names and faces are important to improve lectures. In non-computer classrooms, the p-HInT is the only valuable system which can help students' names and faces.

#### 4.2 Ubiquitous campus environment

A main subject of our university is basically social science. Therefore, almost teachers and students do not have mobile computers such as notebook computers, and PDA. Desk top computers are set in only few lecture rooms and computer rooms. Although we want to achieve a ubiquitous campus environment at our university, spread of mobile computers of teachers and students is difficult. Therefore, we think that DS may be replaced from the mobile computers which are elements of the ubiquitous environment. Of course, DSs can not compute various calculations like computers. However, we can run various web applications on Opera browser of DS. If we develop a web application that can run on DS, everyone can take benefits of the ubiquitous environment of our university without mobile computers.

Therefore, we have developed a campus portal application that can run on Opera browser of DS. This is trial version. Figure 5 shows a DS screenshot of the trial version of the campus portal application. The campus portal application includes web mail, blog sites, campus questionnaires, campus information, and web search. Almost functions that general students and teachers use every day are prepared in the campus portal site on DS. That is, students can access web mail site using DS at a courtyard of our campus, students can show personal blog sites while they have lunch at a canteen of our university.



**Figure 5 Campus portal site of our university on DS**

### 5. Summary

We have developed the p-Hint system: an interactive educational environment with mobile game terminals. A target of the p-HInT is large-scale lectures with two hundreds or more attendees. Teachers can immediately grasp attendees' understanding rates with test on game terminals such as DS. As a result of lectures using the p-HInT, we have confirmed effectiveness of attendant list with sit-down position. In future, we will achieve a ubiquitous campus environment where each student brings a mobile game terminal in order to access a campus portal site. The environment of the p-HInT system with mobile game terminals is useful for not only lectures but also whole campus life.

### References

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