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| Title        | 児童のHID利用状況とレスポンスマークを用いたICT活用授業におけるリクエスト対応支援システム                                   |
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# A Support System for Request Handling in ICT Classroom using Response Maker and Input Data from HID

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**Keywords:** Future school, ICT in classroom, Request Handling, Response Marker.

The main purpose of this study is to improve request handling on ICT usage in classroom education at elementary school. I propose a response maker which is an efficient tool so that a teacher can respond to the students' requests to assist the progress of the individual and collaborative work by analyze and visualize the requests.

The practical experiments for ICT in the classroom were carried out as the projects of the Ministry of Education and the Ministry of Internal Affairs and Communications. In the projects, 20 schools were selected across Japan. They were called "Future School".

Each student in the projects used electric textbooks on a Tablet PC with a wireless local area network in the classroom. The purpose of the projects was to cultivate the ability for creating new value and knowledge based on flexible thinking and extensive knowledge and to become a member of the future knowledge society by a new learning methodology using ICT and the digital materials.

Such digital materials have some features of easy-to-understand learning contents. The students are able to operate the contents many times repeatedly and challenge to operate freely on many times to understand. The

features are good for understanding of learning. Additionally, ICT equipments is able to connect each other via network. This is one of advantage to do collaborative learning.

In such education, the teachers needed not only to teach learning contents but also to operate the ICT equipment at the same time. Thus, it would make an increase in their burden in the classroom. However, most of the teachers did not have the expert knowledge of ICT equipment because they only took a traditional teacher-training course in general.

On the other hands, there is a tendency for the students' requests to increase by ICT usage in the classroom. The reason comes from the fact that some technical knowledge is necessary to use the ICT equipment, such as usage of human input devices, method of power on/off the PC, and so on. In such situation, the students may have requests not only about the learning contents but also about operation of the ICT equipment. It is difficult for the teachers, who do not have sufficient knowledge of the ICT equipment, to take appropriate responses to the requests. The requests would accumulate if it takes much time to handle the requests by the teachers.

In this study, I propose the response marker and response viewer. The response marker is an agent that the students ask or call the teachers as the requests. The response viewer is an agent that the teachers receive and see the requests and learning status of the students.

The purpose of the response marker is to clarify the content of the requests. I focus on screen capture and input of keyboard. Such status is meaningful for the teachers to grasp the level of the students' comprehension such as contents of the students' notebook in the class. In this research, the response marker uses screen capture and quantity of keyboard input as the learning status of the students. It is a rectangular shaped object displayed on the screen. The students can operate it freely across the educational softwares. They move the response marker to an attention point on the screen by dragging and dropping. Then, the response marker makes a screen capture around the marker and send the capture and the input quantity to the response viewer on the teacher's PC via network. The teacher checks through the situation inside the students' PCs from the response viewers' information. Teacher get the situation inside student's PC

by informations on viewer such as screen capture and input quantity what sent by Response marker.

The response viewer would reduce the burden of the teacher to confirm the learning status of the students. This method is easier than the direct way that the teacher confirms each student's PC one by one. The response viewer gives the teacher advises to switch teaching way from one-to-one to one-to-all when the viewer receives many requests. Such advice would perform a precaution against delay of the class.

I have developed prototypes of the response marker and viewer to ascertain the effect of request handling. They were implemented simple functions such as text-based response marker, monitor of keyboard input without analysis, and network connection by TCP/IP, which is minimum functions for the response marker.

Experimental use was carried on a small scale by 8 graduate students. It was conducted 2 short classes designed like the class in Future School. The response marker was left unused into the first period, and it was used on second period.

From the experimental results, both examinees, the role of the teacher and the students, had a good image of the response viewer and marker in the class. As the feedbacks from the examinees of the students, there were some positive comments on the concept of the response marker which captures and sends their learning context. Otherwise, the examinee of the teacher made a favorable feedback to grasp the students' learning status by using the response viewer.

But there were many problems in the practical use. The prototype had some troubles on network connection. Now, the response viewer was able to connect 23 peers of the response marker. Another, the response viewer displayed screen capture directly and did not optimize for total view. These problems were unlikable if the students increase in the classroom. In the near future, I would like to improve these functions to apply the system to actual elementary schools.