Evaluation of Using a Tablet Device for a School Trip

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Abstract: A tablet device can help solve various problems such as shortening the time of pre- and post-learning activities and remedying the problem of unavailability of a personal computer room. Therefore, this research examines how a tablet device can be effectively used for various learning phases in a school trip. The results show that the use of a tablet device is helpful during the pre-learning phase of a "Famous-place Investigation" and in the use of data obtained in this phase and information sharing during the experiential activities. In addition, this study reveals that the use of a tablet device to present an augmented reality poster is effective.

Keywords: Tablet Device, School Trip, Augmented Reality, Practical Class

1. Introduction

When planning a school trip, various problems may emerge such as securing the time required for pre- and post-learning activities. Moreover, to deepen the learning experience, in many cases, personal computers (PCs) are used for collecting information. However, availability of a PC room may be limited, especially in larger schools.

On the other hand, information and communications technology (ICT) have been utilized for learning activities, such as a school trip, to secure safety and improve the learning effect (Kasahara et al., 2013, Sato et al., 2010). Thus, a tablet device is an example of how ICT equipment has been increasingly put to practical use in schools (Hasegawa et al., 2010), and from the perspective of mobility and user interface, such a device has been deemed effective in various applications (Savilla, 2010).

By utilizing the functions of a tablet device, experiential learning activities at a selected location on a school trip as well as pre- and post-learning activities can be accomplished by a single device. For example, if the Internet is available, then information regarding the location or attraction can be obtained using a tablet device as a pre-learning activity, even if a PC room is not available. In addition, by saving such data on a tablet device and utilizing the information during the visit, work can become more efficient, especially under the time restraints of the pre-learning phase. With regard to post-learning activities, the still images and animations obtained from the location can be saved on the device and used for subsequent presentations. Therefore, in this study, a tablet device was employed for a school trip during the pre-learning phase, the experiential activities at the location, and the post-learning phase in order to evaluate its overall effectiveness for such educational activities.

2. Method

2.1 Use of a Tablet Device

A tablet device (Apple iPad2) was used on a school trip for second-year students at a junior high school. Moreover, as shown in Fig. 1, the tablet device was used during the pre-learning phase, the experiential activities at the location, and the post-learning phase. In the pre-learning phase, the famous place that was selected for visiting, the traffic schedule, and the map were investigated; this digital data was saved

on the tablet device. In the experiential activities, the tablet device was used for viewing the aforementioned digital data, information sharing with other groups, creating the activity report (using a TV phone), and producing the still images and animation used in the presentation for the post-learning phase. In this final phase, an augmented reality (AR) poster was produced as a learning tool and the photographs taken by the students of each group were attached to the sightseeing map and printed in A1 size. In this case, if the tablet device is held up by making the photograph into an AR marker, then the animation recorded during the experiential activities will be displayed on the marker.
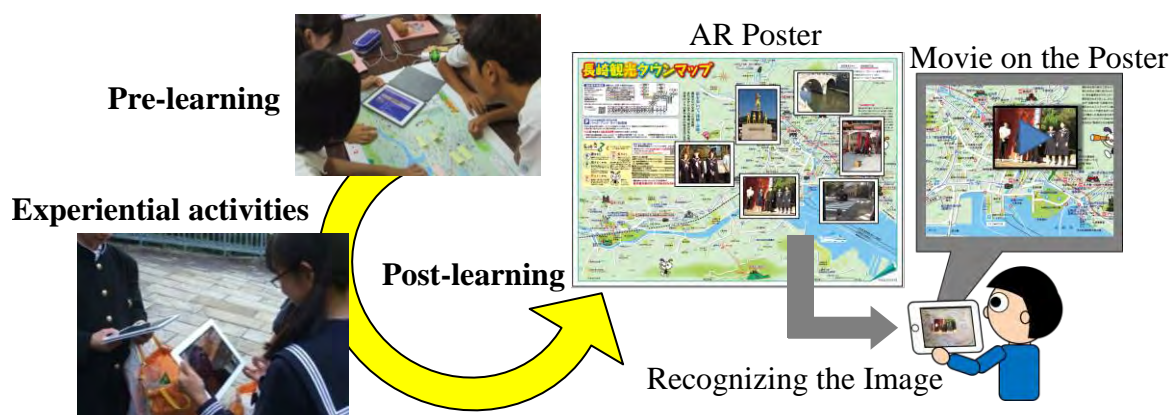

Figure 1. Use of a Tablet Device

2.2 Subjective Assessment by Survey

Evaluation of the use of a tablet device was obtained from the 99 students who participated in the pre-learning and experiential activities. The question items regarding interest and usefulness of the pre-learning activities included "Theme Arrangement," "Famous-place Investigation," and "Presentation." Moreover, the question items concerning the experiential activities were "Usefulness of Famous-place Data," "Interest in Photographs by Other Groups," "Usefulness of Map Data," "Interest in the TV Phone," and "Interest in the Report." The question items regarding the AR poster included "Interest (AR poster was interesting)," "Usefulness (AR poster is useful for presentation)," and "Motivation (I would like to produce AR poster next time also)." Finally, evaluations were performed by 188 students (comprising first and third graders who have not previously participated in a school trip), 19 teachers, and 76 parents.

3. Results and Discussion

Regarding the use of the tablet device in the pre-learning and experiential activities, students responded by selecting either "strongly agree," "agree," "disagree," or "strongly disagree" for each question. The point scores were 4, 3, 2, and 1, respectively. The mean value of the points in each category was then calculated and analyzed using analysis of variance (ANOVA). In addition, multiple comparisons were made using the Holm method.

Figure 2 presents the results of the evaluation for the pre-learning activities. Regarding interest, "Famous-place Investigation" received the highest evaluation, which was followed by "Theme Arrangement" and "Presentation" ($F(2,190) = 31.87$, $p < .01/MSe = 0.30$, $p < .05$). Moreover, regarding usefulness, "Famous-place Investigation" obtained the highest evaluation, which was followed by "Presentation" and "Theme Arrangement" ($F(2,190) = 15.64$, $p < .01/MSe = 0.35$, $p < .05$). Thus, the findings show that using a tablet device was useful for these activities.

Figure 3 shows the results of the evaluation concerning the experiential activities. "Usefulness of Famous-place Data," "Interest in Photographs by Other Groups," and "Usefulness of Map Data" obtained a higher evaluation than "Interest in the Report" ($F(4,208) = 5.30$, $p < .01/MSe = 0.51$, $p < .05$). Therefore, the data obtained by the pre-learning activities and information sharing with the others was useful for these activities.

Figure 4 reveals the results of the evaluation of the AR poster. According to the responses, the participants were not concerned with the subject's attributes, and at least 90% answered in the affirmative for all questions. Therefore, using a tablet device to present the AR poster was useful.
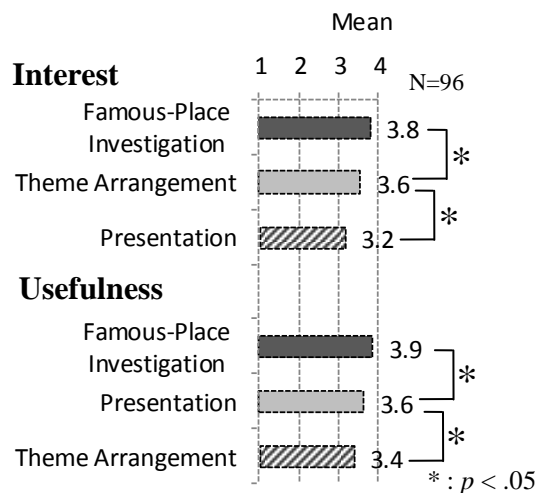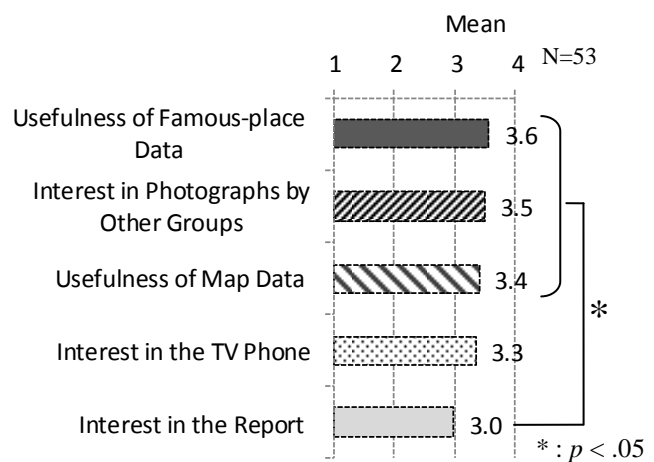

Figure 2. Results of the pre-learning activities

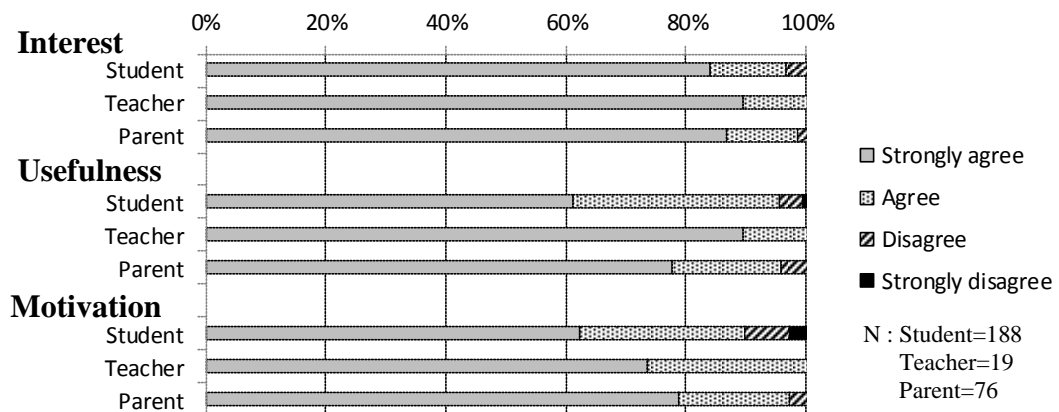Figure 3. Results of the experiential activities

Figure 4. Results of the post-learning activities

4. Conclusion

This study evaluated the usefulness and practicality of a tablet device for a school trip during the pre-learning, experiential activities, and post-learning phases. The results of the evaluation show that using a tablet device during the pre-learning phase of a "Famous-place Investigation" was useful and that the data obtained during this phase and information sharing with others was also useful during the experiential activities. Furthermore, the results reveal that the use of a tablet device to present the AR poster was effective. Although the findings of this study show the effectiveness of such a device for the various learning phases of school trips, further investigation should be conducted regarding its learning effect and usefulness in other situations.

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