

How Did Learners Use a Digital Badge as a Reflection Tool after Completion of an Educational Program?

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Abstract: A digital badge is a symbol not only of completion rewards but also of mastery associated with a learning process and its outcomes. Based on this idea, we designed a digital badge as a learning portfolio linked to an instructional design workshop. This workshop followed a blended format and was offered as an open seminar by Kumamoto University. The current investigation reports the results of a follow-up survey conducted six months after the completion of the workshop, to verify the application and perceived usefulness of the digital badge and the timing of browsing it. Results indicate usages of the digital badge to access learning outcomes and feedback, in addition to its utility as a learning reflection tool for participants. It is also suggested that the digital badge as a learning portfolio might facilitate participants to apply their learning outcomes in the workplace. Other findings indicate that in order to allow novice learners to reflect on their learning outcomes, it might be practical to combine the use of the digital badge that portably gathers meaningful information about learning with opportunities that increase the timing of reflection such as follow-up surveys. Implications and future directions of the study are discussed.

Keywords: Adult learning, Blended learning, Digital badge, Instructional design, Reflection

INTRODUCTION

Supporting learners' reflection on their learning in an educational program is an important component of instruction. This reflection activity is an element of "First Principles of Instruction" identified by Merrill (2009) and is expected to integrate the learning experience in an educational program with real-life situations where the learning outcomes might be used. For working people, reflecting on learning outcomes after training is considered crucial because they are required to apply their learning to their job to recover their investment in education. However, self-reflection is difficult for novice learners or those who are unfamiliar with reflection activities (Willis *et al.*, 2016, p. 27). The problem with introducing a reflection activity for novices is that it is difficult to create a meaningful learning portfolio considering their lack of self-reflection skills. Although systems supporting learners' self-reflection, such as e-portfolio, have been proposed, using these systems effectively requires teaching self-reflection skills. Because this skill is a kind of metacognitive strategy (Gagne *et al.*, 2005) that focuses on the adoption of effective ways based on learners' extensive learning experiences, it takes a lot

of time to master it. Therefore, the challenge is in designing mechanisms to facilitate learners' reflection on their learning outcomes in a short-term program.

In the previous study, the researchers designed a digital badge to help learners create meaningful learning portfolio (Amano *et al.*, 2017). This digital badge was designed to display the accomplishment of learning objectives with evidence such as online report assignments and an asynchronous discussion record of forum posts made during a blended educational program. By introducing the digital badge, we were able to improve the certification of program completion from seat-time based to mastery based. This enabled us to check that learners reached their learning objectives at the end of the program and to ensure the quality of the program. Further, the digital badge that could accumulate the program's learning outcomes was expected to be a useful tool for novices who were unfamiliar with self-reflection and for creating a learning portfolio.

A challenge that remained was that we did not verify the application and usefulness of the digital badge as a reflection tool. Therefore, the purpose of this study was to investigate through a follow-up survey how and when participants use the digital badge after completion of an educational program.

DESIGN OF FOLLOW-UP SURVEY USING THE DIGITAL BADGE

Overview of instructional design courses

The research field was instructional design (ID) courses that were a part of the university extension courses held by Kumamoto University. The purpose of these courses are as follows: 1) to allow participants to gain basic knowledge of ID and to enhance their education from the viewpoint of effectiveness, efficiency, and attraction; and 2) to enable participants to apply ID in educational tasks related to their jobs and present proposals for improving their tasks. Table 1 shows the learning objectives and evaluation methods. To allow participants to learn practical skills that might be useful in improving their educational tasks, the learning objectives were set as intellectual skills focused not on memorization of knowledge but rather on its application. In the post-learning assignment, concrete ideas to improve educational cases and action plans were included to facilitate participants' application of their learning outcomes to their jobs. Thus far, a broad variety of professionals from several fields, such as university lecturers, medical doctors, nurses, and Japanese language teachers, have attended these ID courses. These courses are composed of two courses: an introductory course and a practical course. In the introductory course, participants acquire basic ID skills and consider improvement proposals for educational cases presented by lecturers. In the practical course, the goal is to present improvement ideas for the educational cases that participants engaged in based on the skills they acquired in the introductory course. Both courses consist of prior learning activities (online), a face-to-face program (one day), and post-learning activities (online). The online phases served to allow participants to effectively utilize the one day of the face-to-face program. These online activities were required for submitting coursework items, and they were thus a prerequisite for evaluation to allow participants to select the best learning path. Finally, participants would acquire a digital badge if they met all these evaluation criteria and prerequisites for evaluation on each course of introductory and practical (Figure 1).

The digital badges had different purposes in each course. In the introductory course, the digital badge represented participants' mastery of basic ID skills. This badge was a ticket allowing attendance of the practical course. After the practical course, the digital badge meant completion of both ID courses. In this way, the courses were sequenced to let participants to achieve each learning objective in a step-by-step process. The digital badge for the practical course included the learning outcomes, which contained ideas for improving the educational cases in which each participant engaged. It was expected that participants

would use the digital badge from the practical course in their occupations after completing both courses.

The learning management system (LMS) used for e-learning courses was Moodle. We developed the online assignment and digital badge using the default features of Moodle.

Table 1. Post-learning assignment of the ID course

Introductory course	
■	Learning objectives
●	Demonstrate how to use basic ID skills to improve educational cases
●	Identify the problems of educational cases and select appropriate solutions for it based on the ARCS model
■	Evaluation methods and criteria
●	To score 80% or more in check test
●	Submit the final report and score 80% or more based on the grading criteria. Based on the learning in the course, summarize the following items: <ol style="list-style-type: none">1) Analysis and improvement proposal of ID course participants2) Action plans to use learning outcomes3) Three things that participants learned most in the course
●	Comments on other participants' final reports on the discussion forum in Moodle
Practical course	
■	Learning objectives
●	Propose ideas for improving educational cases
●	One or more of the ID tools can be applied to present suggestions to improve participants' educational cases
■	Evaluation methods and criteria
●	Submit the final report and score 80% or more based on the grading criteria. Based on the learning in the course, summarize the following items: <ol style="list-style-type: none">1) What participants want to continue in their educational case2) What participants want to improve in their educational case3) Three things that participants learned most in the course4) Action plans to use learning outcomes5) Appendix that includes an analysis of their educational cases
●	Comments on other participants' final reports on the discussion forum in Moodle

Design of follow-up survey using the digital badge

Figure 2 shows the blueprint of the design of follow-up survey using the digital badge which was acquired

in the practical course. The follow-up survey to facilitate participants' reflection consisted of two phases: the issuance of the digital badge two or three weeks after participants submitted the post-learning assignment, and the follow-up survey to check participants' progress six months after submission of the post-learning assignment.

First, participants who met the passing criteria were issued a digital badge that was linked to their learning outcomes and displayed feedback from lectures. This first trigger aimed to show participants that they had achieved the learning outcomes. This also aimed to inform participants about how they could improve their jobs in the new fiscal year.

The second trigger to allow participants to reflect upon their learning outcomes was conducted as a follow-up survey six months after completion of the ID

courses. Previous findings suggest that a follow-up not only helps evaluate a training program but also produces a "wake-up" effect (Nemoto *et al.*, 2005). In other words, a follow-up survey could let participants recall their impressions about how the program was conducted, what they learned, and how they applied their learning in their current jobs. This suggests that a follow-up survey might trigger participants' reflection on their learning in an educational program and its application to their jobs. Based on this idea, we designed a follow-up survey using the digital badge. We expected that the digital badge played the role of a support tool for participants' accumulation of learning outcomes. The follow-up survey was also expected to facilitate learners in browsing the digital badge and reflecting on how their learning could be connected to their jobs.

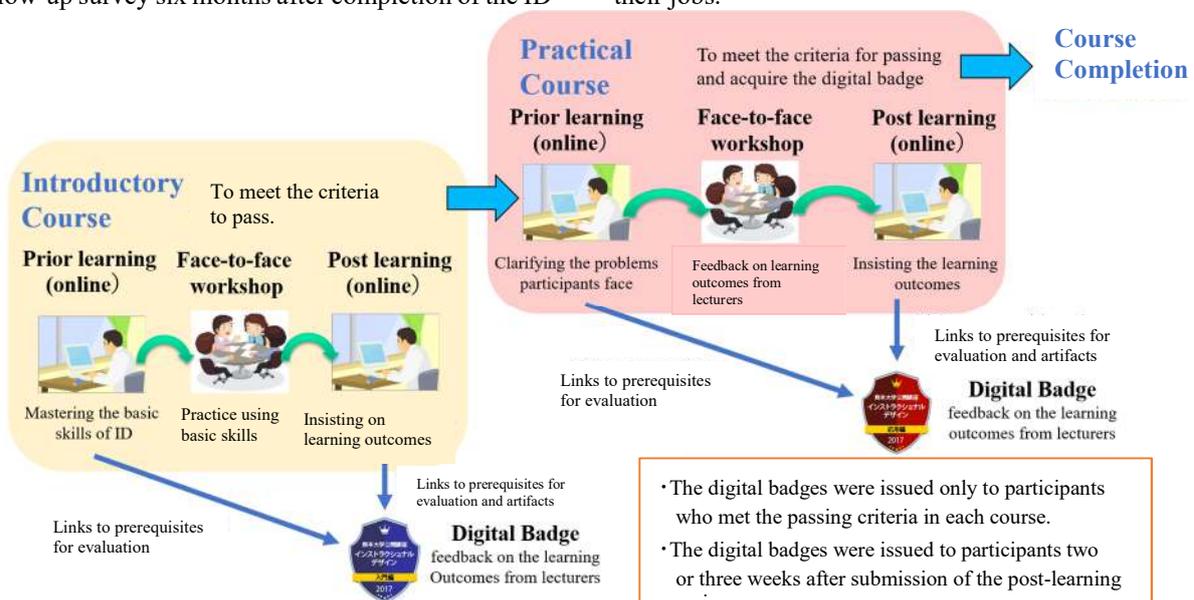


Figure 1. Mastery-based design of the ID courses



Figure 2. Follow-up design to facilitate participant reflection upon their learning outcomes after completion of the ID courses

RESULTS AND DISCUSSION

The follow-up survey was conducted in August 2017, six months after completing the ID courses. We used the questionnaire module of Moodle for this evaluation. Of the 72 participants who completed the ID courses, 57 (79%) responded to the questionnaire.

In the follow-up survey, we confirmed how participants conducted activities using the digital badge which was acquired in the practical course after completing the ID courses by answering the following questions: How do participants use the digital badge and perceive the usefulness of it for learning and for improving their jobs? and When do participants browse their digital badge?

Application and perceived usefulness of the digital badge

The frequency of browsing the digital badge after the completion of the ID courses is presented in Figure 3. Six months after the completion of the ID courses, more than half of all respondents browsed the digital badge only once. The second most were those who browsed the digital badge once in two months. These results show that not many participants browsed the digital badge frequently.

Further, we investigated the purpose of browsing the digital badge (Table 2). Of the 57 respondents, 36 (63%) had some purpose in using the digital badge, whereas 21 respondents (37%) did not have any purpose. Regarding the respondents who had some purpose, there was a tendency to use the digital badge for their own reflection on learning and to increase their motivation: for example, “I looked back at my digital badge not to forget what I learned in the courses,” and “I looked back at my digital badge to be more motivated to improve my educational cases.” Compared to this, there were less number of participants who showed their digital badge to others: “I showed my digital badge to my friends to ask them to learn ID,” and “I showed my digital badge to other participants to deepen my knowledge.” These results suggest that participants tend to use their badges for

their own advantage rather than to share learning outcomes with others.

Supporting participants in facilitating application of them to their jobs and to reflect on their learning outcomes is the primary purpose of letting participants use the digital badge after the completion of their ID courses. In both aspects, more than 60% of respondents showed a positive reaction (Figure 4). Respondents were also required to write the reason for their answer. The reasons why they responded that the digital badge is helpful to improve their educational cases are as follows: “The comments and feedback given in the digital badge pushed me to improve my work,” “The digital badge stimulated my confidence and motivation for learning and helped me to maintain my commitment to improving my work,” “Based on the information attached to the digital badge, such as the learning outcomes and feedback from lecturers, I thought about ideas to improve my educational cases. It also sometimes helped to increase my motivation for these actions.” These comments suggest that the learning portfolio which is attached to the digital badge played a motivating role for some participants and helped them improve their educational cases.

From the perspective of the usefulness of the digital badge for learning after the completion of the ID courses, those who responded positively commented as follows: “If there was no digital badge, I would have surely been in trouble. Although I usually make my own notes, the digital badge is more convenient to use because the information is stored online, which is better than using a notebook. By browsing the digital badge, I can remember what I was thinking, which I sometimes forget,” “The digital badge helped me to consistently review my learning from pre-assignment, face-to-face workshop, to post-assignment of the ID courses,” “I was able to reflect on my learning in the courses from the comments and links attached to the digital badge.” These comments suggest that the digital badge can help to conveniently access learning outcomes and feedback that were perceived useful and to reflect on their learning.

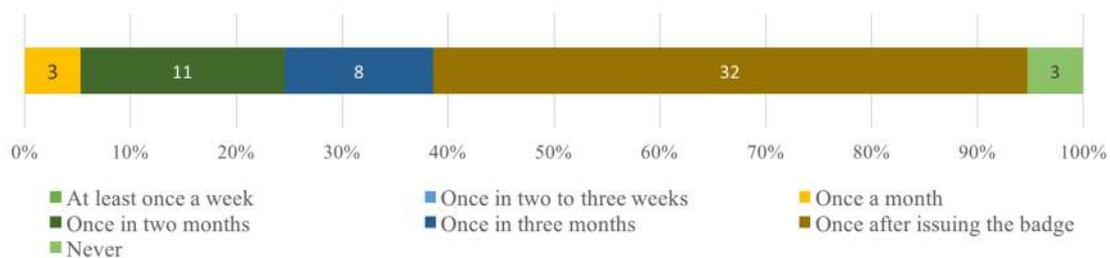


Figure 3. Frequency of browsing the digital badge after the completion of the ID courses

Table 2. Purpose of using the digital badge (N=36, Multiple answers allowed)

Purpose of using the digital badge* ¹	N	%* ²
I looked back at my digital badge so not to forget what I learned in the courses	17	47
I looked back at my digital badge to be more motivated to improve my educational cases	11	31
I looked back at my digital badge to review the progress of educational improvement	6	17
I showed my digital badge to my colleagues or business partner to show them my skills	6	17
I browsed other participants' digital badges to get ideas for educational improvement	4	11
I showed my digital badge to my colleagues to encourage them to attend the ID courses	4	11
I introduced a digital badge into my educational program	3	8
I showed my digital badge to my friends to ask them to learn ID	1	3
I showed my digital badge to other participants to deepen my knowledge	1	3
Others	5	14%

※Note: *¹ The reasons were ordered based on the number of respondents.

*² The percentage of respondents who selected each purpose was calculated out of 36 respondents who responded that they used the digital badge for some purpose.

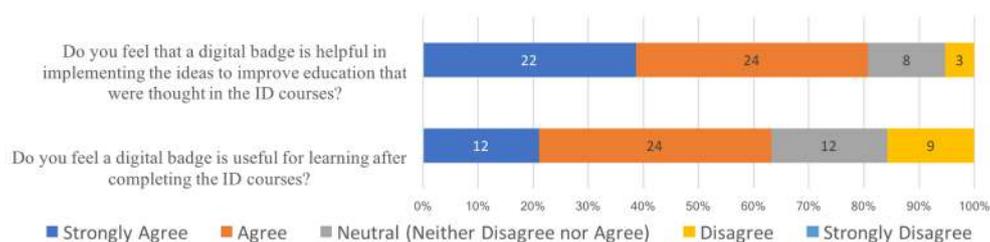


Figure 4. Perceived usefulness of the digital badge after the completion of the ID courses

Timing of digital badge browsing

In this follow-up survey, we asked respondents to answer the questionnaire by browsing the digital badge. Because the digital badge accumulated learning outcomes, it might be a helpful tool to make participants reflect on their learning. The digital badge was linked to an “activity report” page that is implemented by default in Moodle and accumulates all learning outcomes of each participant.

Access logs of participants' activity report page are shown in Figure 5. In 2015, 57 participants acquired the digital badge, and 72 acquired it in 2016. Compared to the results of the ID courses in 2015, which did not implement a follow-up survey, participants' access to their own activity report page increased six months after the completion of the ID courses in 2016 when the follow-up survey was held, although the number of participants who acquire the digital badge also increased. This result indicates that the follow-up

survey itself could be a key trigger that makes participants browse the digital badge and reflect on their learning outcomes.

Furthermore, some respondents mentioned the effectiveness of the follow-up survey in the optional free description field of the questionnaire: “I reviewed my action plan after a long interval. I recalled my feelings when I submitted the final report. I realized that the follow-up survey is necessary. Thank you for reminding me of that moment,” and “Although open seminars and corporate training tend to be over for good once they are completed, my motivation has increased thanks to these ID courses, because they include a follow-up survey. It was a significant result that I was able to perceive my outcomes of educational practices.” From these comments of some participants, it seems that the follow-up survey produced a “wake-up” effect as suggested by previous findings (Nemoto *et al.*, 2005). Further, it was confirmed that participants browse their learning outcomes and reflect on their

progress. This might have happened because the online and portable form of the digital badge allowed more space for storing participants' learning outcomes. If they did not have the digital badge, they would have had to depend on their memory or some portfolio/notebook they might have created. This seems to make it difficult for novice learners to reflect on their learning outcomes. As 53 out of 57 respondents (93%) browsed the digital badge, many

participants use the digital badge for checking their learning outcomes at the follow-up survey. These findings suggest that lecturers can use follow-up surveys to facilitate reflection by participants. Moreover, the digital badge helps participants to conveniently reflect on their learning outcomes. In short, follow-up activities using the digital badge act like "training wheels" for participants' reflection after the ID courses.

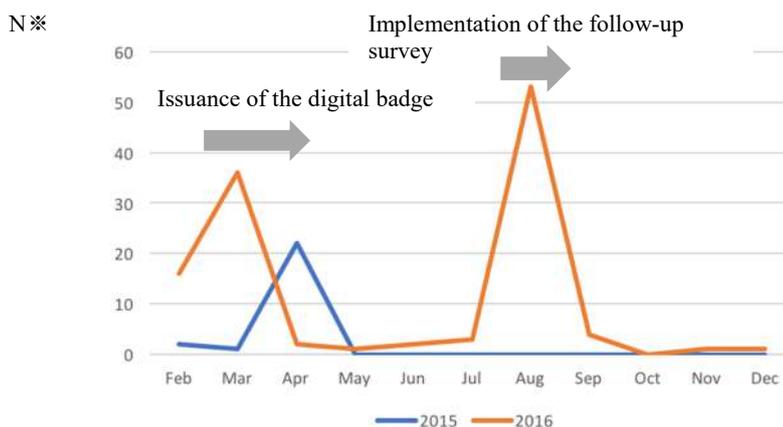


Figure 5. Number of accesses to the activity report page attached to the digital badge
 ※Note: * N shows the number of people who browsed the learning portfolio attached to the digital badge.

CONCLUDING REMARKS

To verify the application and usefulness of the digital badge as a reflection tool, the current follow-up survey was administered six months after the completion of the ID courses. The results presented here suggest that accessing learning outcomes and feedback through the digital badge might be useful for participants' reflection on their learning outcomes. Further, participants' comments indicate that the digital badge can facilitate the application of their learning outcomes in the workplace. Moreover, access logs in the LMS showed that the design of the follow-up survey with the digital badge might trigger participants' reflection on their learning outcomes. These results also suggest that in order to allow novice learners to reflect on their learning outcomes, it might be useful to combine the use of the digital badge that portably gathers meaningful information about learning with opportunities that increase the timing of reflection, such as follow-up surveys. Regarding specific challenges in terms of the use of the digital badge, this study did not analyze how participants were able to improve their jobs qualitatively based on the information attached to the digital badge. The current investigation only examined how they use and perceive the digital badge. Further investigation should be conducted to determine the impact of the digital badge on qualitative changes in participants' jobs.

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