Learning Together for Mastery by Using a Discussion Forum

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***Abstract*—This paper describes a design for peer learning activities using a discussion forum in a learning management system (LMS) after a face-to-face workshop in blended learning environments. The purpose of this program is to share expertise in instructional design (ID) theory and allow participants to master the basic skills of ID. The blended program consists of face-to-face workshops and pre- and post-workshop e-learning assignments. Those who meet the criteria and pass assignments are issued a digital badge as a certificate of completion. The peer learning design on the discussion forum in post-learning phases was supported by the four principles of knowledge sharing, adaptation to proficiency level, reflection as main topic, and group structure and engagement. The targets of this study were novices of the learning contents and were unfamiliar with online learning. Based on these conditions, the peer learning activity was rather simple, which was deemed suitable for this group. Based on participant reactions, it is suggested that the design strategy behind peer learning in this study encourages participants' mastery of content. Further, some participants reported positive reactions toward peer learning in the discussion forum of the LMS utilized in this program.**

Keywords—peer learning, communities of practice, instructional design, digital badge, university extension courses

I. INTRODUCTION

Kumamoto University offers an instructional design (ID) workshop as part of its extension courses promoting lifelong learning. The purpose of the workshop is: 1) to teach participants basic knowledge of ID to improve effectiveness, efficiency, and presentation in learning environments and 2) to enable participants to apply ID in learning environments and present proposals for improvement. A broad range of professionals from a variety of fields, such as university faculty, doctors, nurses, Japanese language teachers, and corporate human resource professionals have attended the workshop. The workshop is blended-style, which consists of online pre-workshop activities, a one-day face-to-face program, and online post-workshop activities. A digital badge is issued as a certificate of completion if participants meet the criteria for passing the course. Although quality assurance of ID workshops was performed by introducing the digital badge and checking each participant's learning outcomes to determine whether they deserve to pass, the issue remained on how to motivate participants to master the learning contents and acquire the digital badge as certificate of completion[1].

One of our strategies to facilitate the workshop completion was to introduce a discussion forum on a learning management system (LMS). The aim here was to allow participants to browse other participants work in the learning processes and become motivated to learn. Since the main feature of this blended digital badge program was participants from various backgrounds, the shared learning in the LMS discussion forum was attractive to participants as they gathered ideas from people they would not usually encounter.

However, the effectiveness of the discussion forum was not verified. Therefore, the purpose of this study was to analyze the design of the discussion forum and verify its effectiveness in facilitating the completion of the ID workshop. We also offer implications for those who have made similar efforts to improve the learning environment.

II. LITERATURE REVIEW

A. Blended Learning Model

One of the popular blended learning models is the flipped classroom model. In a flipped classroom, students often watch assigned online lecture videos outside the classroom to acquire basic knowledge and attend face-to-face classes to apply this knowledge to given problems. Although blended learning is expected to realize educational efficiency, it has other benefits to improving educational practice. For example, blended learning is an effective approach for creative learning communities [2]. One of the models for creating communities of practice is Rosenberg's "new blended learning" [3], which points out that previous blended learning was too focused on training with a lack of performance support. In other words, information technology used in education is mainly focused on providing information or working on problems with only one correct answer. However, there is no single correct answer in real situations. Therefore, it is necessary for stakeholders to share expertise and connect on-the-job training and workplace

learning. Rosenberg [3] proposed a holistic learning system, which includes e-learning, a knowledge management system, a performance support system, and a talent management system, together forming a "new blended learning." This model might be useful for creating learning communities and connecting education with job practices.

B. Peer Learning Theory

Peer learning is one of the essential elements of contemporary learning theory [4]. Peer learning activities offer some learning advantages, for example, effects on the affective domain, such as increased self-esteem, or benefits to one's education through peer feedback [5]. This method is also expected to allow participants to master the ability to learn autonomously [6]. In spite of these advantages, it is not easy to design peer learning activities for effective learning. Jonson et al. [7] pointed out that the design of a peer learning activity itself influences its effectiveness and outcome. In short, learning may not occur spontaneously by introducing peer learning. Suzuki et al. [8] also found that appropriate activities of peer learning are different depending on the participants' level of mastery of cooperative learning skills. Therefore, peer learning activities need to be designed based on the purpose and circumstances.

C. Use of the Discussion Forum in LMS

One of the effective tools for introducing online peer learning is the discussion forum (or discussion board, online bulletin board). Discussion boards enable asynchronous interaction among participants. In other words, participants are not required to be in the same place at the same time. In fact, previous research demonstrated that academic performance and motivation have improved when the bulletin board was used, compared to cases in which it was not used [9] [10].

Although the discussion board has some benefits, it is not enough just to introduce it; the discussion board should be associated with a well-designed learning activity. Blackmon [11] pointed out that "more reflection and thought about a particular topic/idea in the course can produce better cognitive outcomes than just surface posting, or posting only because it is a requirement." Johnson et al. [12] also suggested that design factors, like student engagement, group structures, and organization, influence the nature and degree of deep learning. Therefore, it might be effective to let participants engage in reflection activity through discussion boards, and that this type of group activity needs to be well designed.

Based on this literature review, peer learning introduced in a blended learning environment through a discussion forum might be effective in facilitating participants' completion of the ID workshop. It also seems necessary to design a peer learning activity on the discussion forum by considering the following four points:

A) *Knowledge sharing*: Online blended learning is used not merely for knowledge input but also for knowledge sharing and community building [2] [3].

B) *Adaptation to the proficiency level*: Peer learning activity should be designed according to the proficiency level of the participants' peer learning skills and mastery of contents [8].

C) *Reflection as the main topic*: The discussion topic should be a reflection about learning to facilitate better cognitive outcomes [11].

D) *Group structure and engagement*: Group activity, like group structure and engagement, should be well designed for deeper learning [12].

III. Design of the Blended Digital Badge Program

A. Overview of the Blended Digital Badge Program

The scope of this research followed the "Introductory class of instructional design" offered in 2017 as part of Kumamoto University's extension courses. In this course, learners acquire basic ID skills and consider improvement proposals for educational cases presented by lecturers. The target participants represented a broad range of professionals from several fields, such as university lecturers, medical doctors, nurses, corporate human resource professionals, and Japanese language teachers. All workshops comprised the same content and were held in five venues. The course consisted of online pre-workshop activities, a one-day face-to-face workshop, and online post-workshop activities (Fig. 1). The online phases allowed participants to effectively utilize the one-day face-to-face program. These online activities were required for submitting coursework. Finally, participants acquired a digital badge if they fulfilled the criteria and prerequisites for evaluation in each course. The digital badge was used not as a certificate of participation but as a certificate of completion indicating mastery of the skills and knowledge established as course learning objectives. The learning objectives and evaluation methods are shown in Table 1.

We developed the online assignment and digital badge for the e-learning courses on the LMS Moodle . The digital badge is designed to aid reflection on participants' learning outcomes during the program. By accessing the digital badge, participants could browse a portfolio of the skills they had mastered, review their learning processes and outcomes, and apply their learning outcomes to activities, such as applying for jobs and advertising their education skills to others, including bosses and colleagues. By designing a digital badge to constitute a mastery-based portfolio of skills, we assisted participants in applying their learning to their jobs [1].

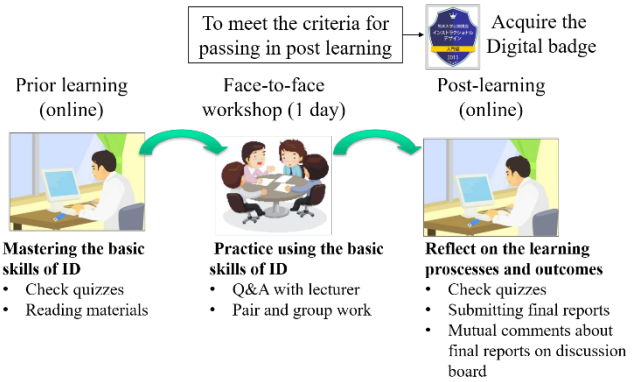

Fig. 1. earning flow of ID workshop.

TABLE I. BLUEPRINT OF THE ID WORKSHOP

- Learning Objectives
  - Demonstrate the basic ID theory applying where and how to improve educational practice
  - Propose an idea for educational improvement based on ARCS motivational model [12] which is four steps of strategy for promoting and sustaining motivation in the learning process: attention, relevance, confidence, satisfaction
- Evaluation Method
  - Score 80% or more on the quiz to confirm basic knowledge of ID.
  - Submit a final report comprising the following in order to pass:

    1) Proposal for improvement of the ID workshop they attended based on the ARCS model
    2) Propose a future action plan to use ID models in participants' jobs
    3) Mention three things learned in the program

B. *Peer Learning Design in the Blended Digital Badge Program*

We designed the peer learning activities by using the discussion forum in the LMS in the post-learning phase. The main features of e-learning enable interactions with participants from various backgrounds without the restrictions of location. E-learning also enables participants to discuss learning contents in detail by using a discussion forum in the LMS and attaching PDF files to it asynchronously. Therefore, we constructed a peer learning environment as a place for participants to discuss as much as they want with a person of their choosing. The activities were designed to facilitate participants' engagement with one another.

After the face-to-face workshop, the post-workshop assignments were prepared. The purpose of this activity was to reflect on the learning and share learning outcomes among participants, as well as to facilitate participants' encouragement of each other to realize action plans. In particular, each participant was required to post final reports and also post comments on other participants' final reports (Table 1).

The target participants of this workshop were novice learners of ID and were unfamiliar with peer learning through discussion forums in LMSs. Based on these participant features and the four design points discussed in the literature review, we designed a peer learning activity in the post-learning phases (Table 2). As indicated by principles C and D, minimal and simple peer learning was required of participants because they were novices.

TABLE II. PEER LEARNING DESIGN PRINCIPLES OF THE POST-LEARNING PHASES

	Principles	Strategy in the Post-Learning Phases
A	Knowledge sharing	Learning can be shared among participants through the discussion forum in the LMS
B	Adaptation to the proficiency level	Impressions on others' final reports were provided, rather than doing collaborative work or peer review
C	Reflection as the main topic	The final reports were a reflection of the whole learning process and learning outcomes.
D	Group structure and engagement	Paired work was adopted and at least one comment on other participants' final reports was required

IV. METHOD

We examined the results to verify the impact of the peer learning design: (1) user logs of post-workshop assignments were recorded in e-learning systems to show the actual state of peer learning online; (2) the percentage of those who acquired the digital badge (completion rates) was calculated and reasons why participants completed the workshop and acquired the digital badge were identified; and (3) free descriptions were reviewed in the final reports which mentioned peer learning through the discussion forum.

Attributes of the participants who attended the blended digital badge program and were subjects of the survey are shown in Figs. 2-5.

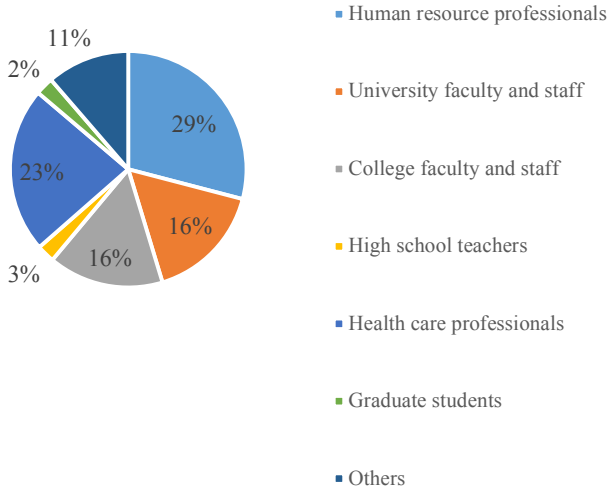

Fig. 2. Attributes of participants ($N = 203$).

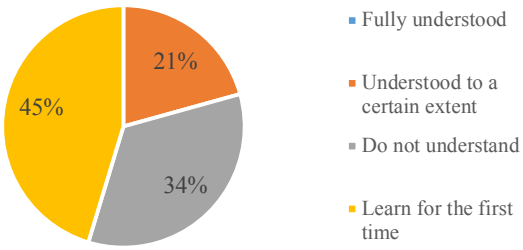

Fig. 3. Understanding of the learning contents before the blended digital badge program ($N = 203$).

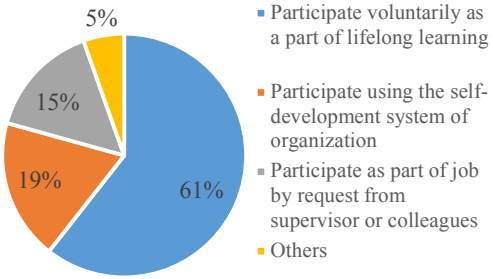

Fig. 4. Whether attending the blended digital badge program is a job requirement ($N = 203$).

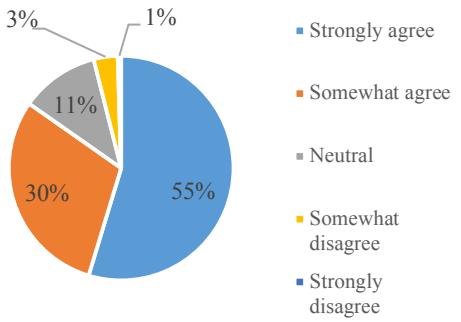

Fig. 5. Extent to which participants agree with the statement "I want to acquire a digital badge (certificate of completion) by meeting the criteria for passing." ($N = 203$).

V. Results and Discussions

A. User Logs of Post-Workshop Assignments Recorded in e-Learning Systems

The participants' efforts on the online discussion forum are shown in Tables 3 and 4. The average per capita posting of a peer review was 3.25, and the average per capita browsing of other participants was 26.23. Although the minimum requirement was to post one comment on other participants' postings, almost all participants exceeded this.

Fig. 6 also illustrates the timing of the activities: 1) Participants posted their final reports on the discussion forum, 2) commented on other participants' final reports, and 3) browsed other participants' final reports. The most frequently posted and commented on item of the final reports was deadline dates for post-task assignments (12/24). These results suggested that peer learning requires a schedule for participant activities, such as assignment deadlines.

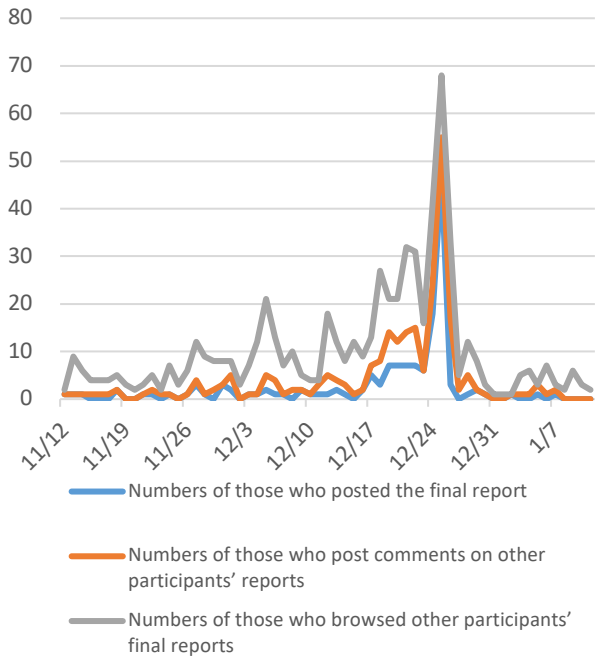

Fig. 6. Number of those who posted comments on other participants final reports

TABLE III. Posting Status of Final Reports and Peer Review

	Final Reports	Peer Review
Number of postings	150	490
Number of participants	150	151
Average per capita	1	3.25

TABLE IV. Browsing Status of Other Participants' Posted Final Reports

	Other Participants' Final Reports
Number of browsing other participants posts	4263
Number of participants	162
Average per capita	26.23

B. Completion Rates in the Blended Digital Badge Program and Reasons for Completion

Table 5 presents the completion rates for the blended digital badge program. Although this program did not have motivational incentives for participants to complete the program, such as providing formal university credit or the promise of workplace promotions, more than half of the participants completed all the assignments and met the criteria for passing the assignments.

TABLE V. Completion Rates for the Blended Digital Badge Program

	Participants Who Acquired the Digital Badge	Total Participants
Numbers	140 (69%)[a]	203

Reasons for completing the blended digital badge program were explored after assignments were submitted. Participants were required to write reasons for their completion. Some participants commented that they wanted a return on their participation fee and desired the learning experience in the blended digital badge program. Others commented that the program contents were useful for job improvement, and completing the program was a prerequisite for a subsequent educational program. Comments mentioning the presence of other participants were frequent: "Because I could browse the other participants' efforts through the discussion forum in LMS;" "The other participants' posts in the discussion forum made me feel like I was not alone and motivated me to finish;" "Through face-to-face workshops and an online discussion forum, I can learn a lot;" and "I wanted to become a member of a community created by the blended digital badge program." There were 17 comments mentioning the presence of other participants (12% of total participants completing the program). These comments suggest that the strategy for facilitating the sharing of expertise or learning outcomes might be effective in supporting participants' completion of the program.

C. Participants' Impressions on the Peer Learning Activity Through the Discussion Forum

In the final reports, several participants mentioned that peer learning motivated them to learn; thus, the very fact that other participants posted in the LMS facilitated participant learning. For instance, one participant commented that "I think it was good to be able to collect information to post and view other people's opinions on the discussion forum. In addition, by having a discussion forum, I was able to foster a sense of needing to work, and I was able to work positively." Another commented that "I realized that the method of posting a report on a discussion forum and making a shared comment

improves the learner's motivation more than I had imagined. The joy of having other students recognize and agree with others' opinions, and the inspiration from other people's wonderful contributions, has motivated us to learn."

Some participants also mentioned that they felt a sense of community through the discussion forum. One participant commented "Participants all had different backgrounds, but I understood that the challenge we faced was the same, and I felt a sense of community and a desire to try again. Furthermore, I want to deepen my learning and practice with people who have the same attitude." Another mentioned that "By looking at the discussion forum, participating in the course provided some hints. The time spent with other participants with the same challenge must surely have numerous discoveries, and the desire to participate in the course increased." From these comments, we confirmed participants' positive reactions to peer learning on the discussion forum.

VI. Concluding Remarks: Learned Lessons and Implications

In this study, we reported the design of peer learning activities on the discussion forum in our digital badge program and verified its effect. The design of peer learning on the discussion forum in the post-learning phases supported by the four principles of knowledge sharing, adaptation to the proficiency level, reflection as the main topic, and group structure and engagement received positive reactions from some participants. In particular, it was suggested that this design facilitated completion of the program and provided motivation to learn, while fostering a sense of community.

The study targets were novices in ID and were unfamiliar with online learning. Based on these conditions, we designed a simple peer learning activity involving posting an impression of the other participants' final reports in the discussion forum. Our findings show that this simple method of peer learning worked effectively for the novice learners. The reason might be that participants did not often have opportunities to know others' work. Therefore, such a small technique had various impacts.

Although we did not verify the overall impact of peer learning activities on the participants, we found that peer learning activities in the discussion forum helped participants feel motivated to complete and workshop and feel a sense of community. The quality of the interactions among participants was also not investigated. In the future, it would be useful to examine participants' interactions in greater detail.

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References

[1] Amano, K., K. Suzuki, S. Tsuzuku, & N. Hiraoka, "Designing a digital badge as a reflection tool in blended workshops," J. Inf. Syst. Educ., vol. 16, pp. 12–17, 2017.

[2] Strayer, J. F., "Designing Instruction for Flipped Classroom," in Instructional-Design Theories and Models: The Learner-Centered Paradigm of Education, vol. IV, C. M. Reigeluth, B. J. Beatty, and R. D. Myer, Eds. New York: Routledge, pp. 321-349, 2017.

[3] Rosenberg, M. J. "Performance support," in Trends and Issues in Instructional Design and Technology, A. R. Reiser, and V. J. Dempsey, Eds. New York: Pearson, pp. 132–141, 2018.

[4] Vygotsky, L. S. Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press, 1978.

[5] Topping, K. J. "Trends in peer learning." Educ. Psychol., vol. 25, pp. 631–645, 2005.

[6] Johnson, D. W., R. T. Jonson, and K. A. Smith, Active Learning: Cooperation in the College Classroom. Edina, MN: Interaction Book Co., 1991.

[7] Johnson, D. W., R. T. Jonson, and E. J. Holubec, The New Circles of Learning: Cooperation in the Classroom and School. Alexandria, VA: Association for Supervision and Curriculum Development, 1994.

[8] Suzuki, K., J. Nemoto, A. Takeoka, A. Takahashi, and Y. Shibata, "Sequencing collaborative activities in an online graduate program," International Conference on Media in Education 2013.

[9] AlJeraisy, M., H. Mohammad, A. Fayyoumi, and W. Rashideh, "Web 2.0 in education: The impact of discussion board on student performance and satisfaction," Turk. Online J. Educ. T., vol. 14, pp. 247–258, 2015.

[10] Bye, L., S. Smith, and H. Monghan Rallis, "Reflection using an online discussion forum: Impact on student learning and satisfaction," Soc. Work Educ., vol. 28, pp. 841–855, 2009.

[11] Blackmon, S., "Outcomes of chat and discussion board use in online learning: A research synthesis," J. Educ. Online, vol. 9, 2012. Retrieved March 2019 http://files.eric.ed.gov/fulltext/EJ985399.pdf

[12] Johnson, C., L. Hill, J. Lock, N. Altowairiki, C. Ostrowski, L. da Rosa dos Santos, and Y. Liu, "Using design-based research to develop meaningful online discussions in undergraduate field experience courses," Int. Rev. Res. Open Dis., vol. 18, 2017. https://doi.org/10.19173/irrodl.v18i6.2901

[13] Keller, J. M. Motivational Design for Learning and Performance: The ARCS Model Approach. New York, Springer, 2010.