P2P Digital Badge for Building a Learning Community

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One of the issues encountered in providing learning opportunities to adult learners is how to motivate these learners using learning outcomes in their lives after they complete the training program. This paper proposes a P2P (peer-to-peer) digital badge model to facilitate action based on learning outcomes and sharing the results thereof. The P2P digital badge is a certification of achievements that is issued if multiple reviewers agree that a learner's results meet the success criteria. This badge is also linked with information regarding the peer review process, such as that evaluator's information and evaluation scores. This paper describes the design of P2P digital badge, and future research is needed to build upon this concept.

Keywords: Digital Badge, Microcredentials, Peer Assessment, Learning Communities

Introduction

Continued support after training programs is an important component in the instruction of adult learners. Kirkpatrick and Kirkpatrick (2016) propose a four level model of training evaluation and believe that successful training for adults can be measured not only by satisfaction and skills mastery in the classroom, but also by actions taken in job settings and the impact of these actions on their jobs. Following up on outcomes and continued learning after the completion of training is an effective way to support adult learners. This also maximizes the learners' return on their educational investment.

Creating learning communities among the learners may be one of the most effective ways to provide learning opportunities following a training program. Bielaczyc and Collins (1999) state that learning communities must have the following four characteristics: "(1) diversity in expertise among its members, who are valued for their contributions and given support to develop, (2) a shared objective of continually advancing the collective knowledge and skills of the community, (3) an emphasis on learning how to learn, and (4) mechanisms for sharing what is learned" (P272). If we create learning communities that have these characteristics, learners from diverse backgrounds could share their practices and lessons learned from experience. This also enables learners to give feedback on their outcomes, thereby contributing to each other's growth. However, expected learners' actions toward further learning after a training program do not always occur spontaneously. Drivers are required to reward certain learners' actions and monitor their performance (Kirkpatrick and Kirkpatrick, 2016).

In this research, we focus on the use of a digital badge as a tool that motivates learners to share their outcomes and give feedback to other learners after they complete the training program. A conceptual framework for these learners is discussed from theoretical perspectives and P2P (peer to peer) digital badge models are proposed based on the framework. Value propositions for educational practitioners and the challenges for practical applications of P2P digital badge models are also discussed.

Conceptual Framework

The use of digital badges in educational settings is diverse (Hickey and Chartrand, 2019). Some practitioners use digital badges as rewards on certain learning activities, including points or check points based on gamification. Others use it as a certification of competency and mastery, which is issued based on rigorous learning assessments. In this section, we discuss the conceptual framework for P2P digital badge design to clarify our design's approach toward digital badges.

Digital Badge as Alternative Credentials

Digital badges are becoming popular tools for certifying and demonstrating learning outcomes. Peck (2015) defined digital badges as "'clickable' graphics that contain metadata that can reveal information about the individual or

organization that issued the badge, the criteria met to earn the badge, the tool(s) used to assess the evidence, and the evidence of learning itself." Compared to traditional paper transcripts or certifications, digital badges can include comprehensive, detailed information about learning. This function of digital badges is expected to promote evidence-based educational practices and enhance the quality of education. Upon completing training programs, it is also expected that learners will be able to easily demonstrate and communicate their abilities with confidence and reliability.

The informational richness of digital badges regarding the learning process and outcomes could potentially impact how we teach and learn. However, there might be challenges in accessing these possibilities because there are differences in the kind of information digital badges contain. West and Randall (2016) pointed out that "gamifying badge(s)" have no meaning to people outside the training program. For example, some educators use digital badges similar to how they are used in video games. If learners finish learning activities, they then acquire a digital badge, which is mere graphic image that is not linked to information about the learner's learning process and outcomes. This type of badge may have some significance among participants of the same activities, but it has no significance for those who do not participate in these activities because it does not describe the learning process or outcomes. This use of digital badges may motivate learners to take action, but the digital badges may be expected to represent alternative credentials with different values.

Digital badges are just a tool used in education. The value that they can bring to education depends on how they are designed. If the reason for the use of a digital badge is unclear and the appropriate usage for such a badge is not considered, the value of such a digital badge might be limited.

Our reason for using digital badges is to build learning communities which facilitate peer learning among learners. Therefore, we issue digital badges if learners contribute to their learning communities. Digital badges also include information (as metadata) regarding the level of learners' contribution to their learning communities.

Digital Badge based on peer-networked learning

One of the digital badge design approaches is "participation" badges, issued for engaged participation in social learning (Hickey & Chartrand, 2019). The word "participation" in this badge design does not mean attendance of a training program for a certain duration of time. Rather, it indicates successful engaged participation in social practices based on the social constructionism approach. The cognitive apprenticeship (Collins et al., 1989) and community of practice (Lave and Wenger, 1991) theories are listed as some of the representative theories for this approach. Hickey & Chartrand (2019) stated that digital badges based on this approach emphasize "(a) badges for engaged participation in social learning and completion of collaborative projects, (b) peer and "crowdsourced" assessments, and (c) social and cultural forms of motivation" (P950).

Previous research demonstrated the effectiveness of digital badges certifying learners' contributions to learning communities. For example, Itow *et al.* (2016), conducted an interview with project managers who were engaged in 30 different projects developing digital badge systems and discussed the factors of the successful use of digital badges for learning assessments. The results showed that the badges for fostering peer-network centered learning were more successful than other badges. Godrum *et al.* (2016) used digital badges for faculty development in Indiana University. Badges were issued if the criteria for success were met based on peer review among badge program participants. Although this paper includes work in progress reports of projects and project evaluation was not conducted, the authors aimed to foster a sense of community and accomplishment among program participants.

P2P Digital Badge Design Model

Based on a literature review, the following two approaches of digital badge design were adopted for building learning communities: (a) a digital badge is a digital certification containing comprehensive data about learning processes and outcomes, (b) digital badges certify peer and networked learning among program participants. This model was named P2P (peer-to-peer) digital badge because this badge is issued based on peer-networked learning and demonstrates this as badge associated information.

Use case of P2P digital badge model

It is assumed that P2P digital badges might be used as drivers for knowledge sharing in follow-up activities after the completion of a training program. Figure 1 shows the visual image showing when this model should be used.

P2P digital badges are expected to motivate leaners to share their outcomes after training completion and give feedback on their experience to other learners. For this aim, if learners submit outcomes that meet the criteria for success based on peer assessment among learners, they will be issued a P2P badge as certification of excellent

practice. The reviewer's information is also associated with this badge, so that the reviewer is also rewarded for their effort in assessing the learners.

Figure 1
Use case of P2P digital badge
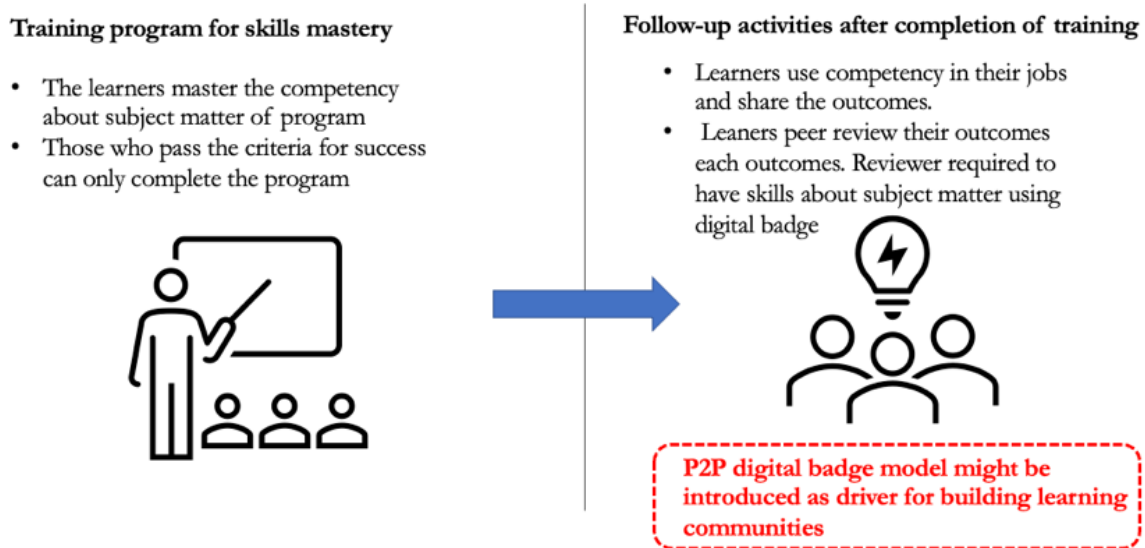
Badge issuing process

The P2P badge is issued if the criteria of success are approved through the multiple reviewers' assessments. Reviewers must meet certain prerequisites, such as possessing a badge of skill acquisition, so that this evaluation process assures the quality of the evaluation. It is desirable that multiple reviewers conduct reviews to increase reliability of the assessment. The badge should only be issued if the outcomes shared by a learner meet the conditions for the issuing of the badge. This increases the validity of evaluation process.

**Figure 2**
Badge issuing process
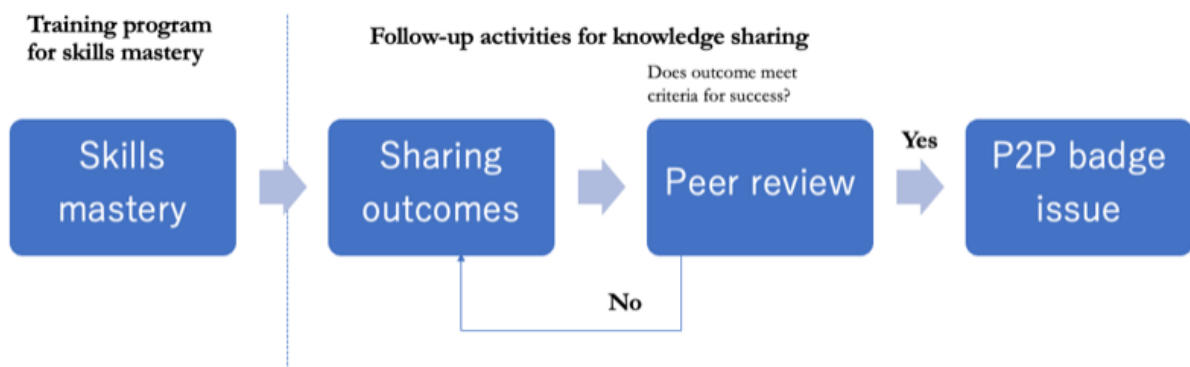
Information associated with digital badge

P2P digital badges will be typical badges that demonstrate the owner's skill mastery and are associated with learning objectives and success criteria of learning outcomes. Furthermore, the P2P digital badge model proposes that the information of the assessor/reviewer also be added to the information associated with the badge

The value of the badge might be influenced by the assessors' expertise level. While a badge certified by a novice learner might have lower value, badges certified by experts or persons of influence will likely be of high value and have a significant impact on those who see them. We proposed that badges provide viewers with access to information about evaluators, such as badges demonstrating their skill level and proving they meet the prerequisites to be an assessor. This has an effect on the value of the badges.

Linking badges with reviewers' information also rewards the reviewers' efforts. Typically, the assessors' efforts are not visible even though they contribute immensely to learning communities. P2P badges linked with reviewer information acknowledge and certify reviewers' efforts.

Figure 3
Additional information associated with digital badges in the P2P design model

Added information proposed by P2P digital badge model
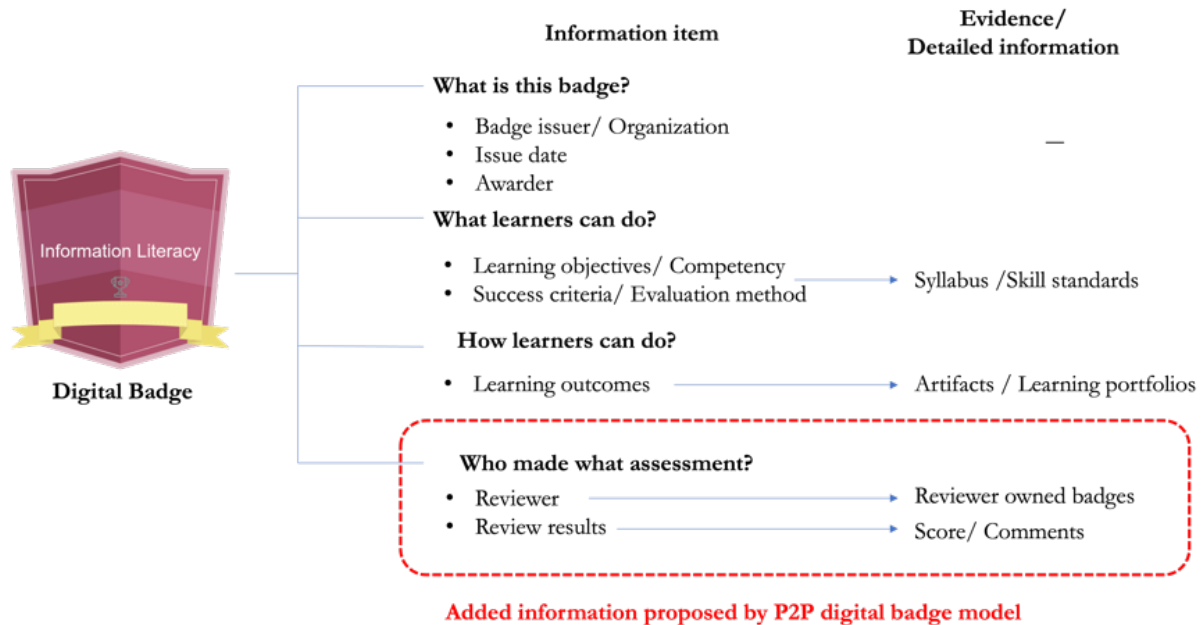
Discussion

The P2P badge is expected to be a key driver that motivates learners to share their outcomes and contribute to learning communities after they complete their training programs. They might also add value as alternative credentials in today's reputation economy where others' evaluation of products or services is highly valued, an example being online reviews. The value proposition of digital badges is enhanced when the assessors'/reviewers' identities are associated with the badges they certify.

There might be also challenges in implementing the P2P digital badge function regarding "who made what assessment." For example, the digital badge modules standardly equipped in learning management systems are not linked to assessors' information as these systems are primarily concerned with the organizations' administration. In addition, there are few functions connecting digital badges with peer-networked learning among learners. Add-ons would need to be developed to achieve the ideal P2P digital badge design.

Conclusion

In this paper, we discussed the expected value and challenges of P2P digital badges that are issued based on peer-networked learning among learners and are associated with peer reviewers' information. We hope that future research will expand the capabilities of digital badges.

Acknowledgment

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