

Sharing Best Practice of Teachers for Learning Analytics at Scale

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Abstract Nowadays, using tablets in classrooms seems to be mandatory for school teachers in Japan. Therefore, it is important to share the knowledge about digital devices with school teachers who are beginning to familiarize themselves with these devices. In this paper, we introduce a framework for sharing teachers' best practice for effective use of digital learning tools based on the learning analytics (LA) platform. We call it the "evidence portal" as it provides users "evidence" for adopting new technology in classrooms. Compared to the existing studies, the evidence portal has two characteristics: 1. It has a seamless connection with Moodle so that all users can share their practice, and 2. It has a direct connection from the LA dashboard via REST API protocol so that users can share their analysis directly from the LA dashboard. By sharing the analysis results, we can involve other teachers, colleagues and administrators as well as teachers and students, which in turn, will support LA at scale in Japanese secondary schools.

Keyword Learning Analytics, Evidence Portal, Secondary Education

1. Introduction

For the success of learning analytics (LA) adoption in schools, teachers not only need to learn new skills regarding the technology they use but also need to engage in pedagogical innovation about how to use those technologies in classrooms (Law & Liang, 2020). A pedagogical framework known as "TPACK" has been proposed for effective teaching with technology, which emphasizes three bodies of knowledge for teachers, namely content, pedagogy, and technology (Koehler & Mishra, 2009). In this paper, our research objective is to introduce a portal site specialized for sharing the best practice of teachers about the effective use of digital learning tools on the LA platform. Our research project has been offering an LA platform including an LMS (Learning Management System), ebook reader, and dashboard to several schools in Japan; however, what kind of uses were effective in the class? was not well answered in our context. Our proposed system, the "evidence portal" offers users "evidence" for adopting new technologies in their classrooms. In the following sections, we will describe existing studies for LA at scale and examine how our "evidence portal" differs from existing evidence sharing platforms in education.

2. Related Works

For LA at scale, several attempts have been made around the International Conference of Learning Analytics and Knowledge (LAK) community. For example, the evidence hub was created by learning analytics community exchange, aiming to gather evidence on learning analytics and inform effective LA implementations to researchers and policy-makers (Ferguson & Clow, 2017). The authors proposed to classify LA research into four propositions: learning outcome, learning support, deployment at scale, and ethics and to visualize it by

its results and country. In addition, guidelines for the implementation of predictive LA were proposed by the Open University in the UK (Herodotou et al., 2019). The university offers eight recommendations for facilitating predictive LA for higher education at scale.

3. Evidence Portal

However, little progress has been made for adopting LA in secondary schools. Especially in Japan, there is a lack of evidence about LA in the classroom. Therefore, we proposed a web-based case-sharing portal site, the "evidence portal" for our LA platform in schools. Compared to the existing studies, it is characteristic on two points: 1. It has the LTI (Learning Tools Interoperability) authentication so that all users can share their practice seamlessly from LMS, and 2. It has a direct connection from the LA dashboard via REST API protocol thus that users can directly share their analysis from the LA dashboard (see Figure 1).

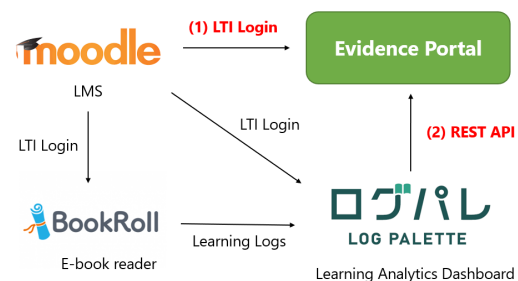


Figure 1. Evidence Portal on our LA platform.

We use *Moodle* as the LMS and entrance to all the learning tools. *BookRoll* is an ebook reader where teachers upload their teaching materials (Ogata et al., 2015). *Dashboard* is a log visualization tool for

BookRoll, which enables users to see their learning progress (Majumdar et al., 2019). We added the evidence portal to share the results of the analysis and effective teaching strategy using the LA platform.

4. Sample Use Case: Data Driven Group Work

Here, we show an example usage of our evidence portal. First, we assume that a teacher tried to use a specific learning tool in a class (here, the automatic group formation module; Liang et al., 2021). Second, the user logs in to Moodle and opens the link to the course. By clicking the link to the course, the user can automatically log in to the evidence portal via an LTI authentication plugin. Here users can post their practice by the “creating a post” button in the middle of the front page.

On the case registration page, users can share their practice. An example case is shown in Figure 2. Here, we prepare a template for usage cases. It includes - classroom information (e.g., school name, grade, etc.), tools they used for the class, purpose, and what they did before, during, and after the class. Quantitative evaluations will be added when they use the dashboard to post their practice. Moreover, we prepare some categories and tags for a post. Categories represent some teaching strategies like peer instruction or flipped learning and the tags represent the class information like grades and subjects. Thus the users can easily search the posts that are relevant to their class.



Figure 2. Structure of a case on the evidence portal.

5. Discussion and Conclusion

According to the concept of LA, successful learning analytics is represented as a cycle (Clow, 2012). It starts with users (students) and, through the collection and analysis of data, it ends up with interventions to the students again. In this perspective, the evidence portal will extend the cycle by adding an external component for sharing the

results of the analysis. By extending the cycle, we can involve other teachers (colleagues) and administrators as well as teachers and students. It will support LA at scale.

However, we still have two challenges and limitations regarding this system. First, the connection from the dashboard to the evidence portal is still under development. We have already implemented API functions on the system, but we need to work on the call from the dashboard. The second point is the lack of evaluations of the system. We need to increase the number of active users on the system and ask them about its useability. We hope the evidence portal widens the possibilities of LA and further encourages evidence-based practice by teachers.

Acknowledgment

This study is supported by JST JPM-JAX20AA, JSPS 21J14514, SPIRITS 2020 of Kyoto University, JSPS 20K20131, 20H01722, 16H06304, NEDO JPNP18013, and NEDO JPNP20006. We thank all the teachers in the partnering school who kindly cooperated with this study.

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