

# E-book based Learning in times of Pandemic

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**Abstract:** As a necessary preventive measure against the spread of Novel Coronavirus (COVID-19), many educational institutions across the globe are changing the style of traditional teaching-learning interactions from classrooms to online modes in a very short period. Data gathered from an online survey conducted with participants (educators and researchers, n=57) from 19 different countries, found that digital divide, uncertainty regarding student's participation in the online activities, and the increase in effort of the teachers to make the rapid transition to a new online mode of teaching and learning are some of the common challenges during this period. We propose how BookRoll, an eBook-based and learning analytics enhanced system has a low floor and high ceiling to continue interactive learning activities during this period. This proposal has the following advantages: It takes lower bandwidth to distribute learning materials than video-based learning activities; teachers can directly use their previously created content with the students and provide easily trackable in-content formative evaluations (specific reflective questions or annotation-based activities).

**Keywords:** Learning Analytics, eBook-based teaching and learning, Learning Evidence Analytics Framework (LEAF), BookRoll, K-16 education, COVID-19 pandemic

## 1. Learning Status during Pandemic and Motivation

While COVID-19 continues spreading, like in many countries, Japan too enforced emergency remote teaching and learning at schools and universities. In this work we explore the affordances of eBook technologies to support this challenging period. A questionnaire-based survey was created to collect the perception of educators regarding the current situation and issues in migrating to online pedagogy to continue education. It was distributed by purposive sampling, through a mailing list and social media post from 17 March 2020. The mailing list had 513 members involved in learning analytics research and practice at 272 institutions in over 20 countries. The members of this community were selected as they would be aware of digital teaching-learning scenarios in their country, and some are involved in policy making at institutions. 57 responses were received by 6 April, 2020 from 19 different countries. A majority, 48 (84%), identified as university teachers, and 32 (56%) were associated with higher education focused educational technology research. 8 were in administrative roles at universities and 3 from K12 schools. 32 (58%) reported they had both synchronous and asynchronous online components for teaching-learning activities. Teachers often create or curate their teaching materials (notes, assignments, assessments) and conduct these online activities. Amongst the respondents, 51 (89%) created their lecture materials using presentation software and added voice, 4 of them while conducting synchronous online lecturing. 21 (36%) recorded their lecture for delivery using online software and also using screen recording. For synchronous teaching 3 of them used online whiteboard and polling apps. 17 (30%) of the teachers were preparing to let students view learning materials, participate in discussion forums, submit assignments and take assessments online. The degree of support given by institutions to the respective teachers included guidelines, resources to create materials and distribute among learners, staff support for creating the materials and training sessions before or during this period. While 12 (23%) respondents reported that they had all support items, 10 (19%) only received guidelines from their respective institutes. As a teacher they expected their students were using home's broadband internet connection accessing via PCs or Tablet. Mobile phones used mobile data. Many expected the duration of online activities of the students to be more than 5 hours per day.

## 2. BookRoll: A Learning Analytics enhanced eBook platform.

BookRoll can be linked to most learning management systems (LMS) by LTI and teachers can upload learning materials in PDF format, and students can access them in a wide range of devices through a standard web browser. The platform then records the interactions of browsing and annotations on those materials to collect log data. Figure 5 shows the reader's interface and functions in BookRoll. Users can annotate by marking sections of reading materials in yellow to indicate sections that were not understood or red for essential sections. Students can type or draw memos on a page or with a marker to attach it to a specific section of the page. Users can also bookmark pages or use the full-text search function to find the information they are looking for later when revising. Based on the finding in the survey, we also developed an audio upload function associated with each learning material (see the interface in Figure 6). Now teachers can easily upload their spoken lectures or any other tutorial audio associated with those materials. The students can control the audio, which plays automatically when the material is accessed. Based on analysis of the log data LEAF provides various services for the users, such as a learning dashboard for monitoring reading behaviors (Majumdar et al. 2019) to conducting specific teaching-learning activities, AI-driven content recommendation systems (Yang et al. 2019), and reading supports such as smart dictionaries (Lecailliez et al. 2020).

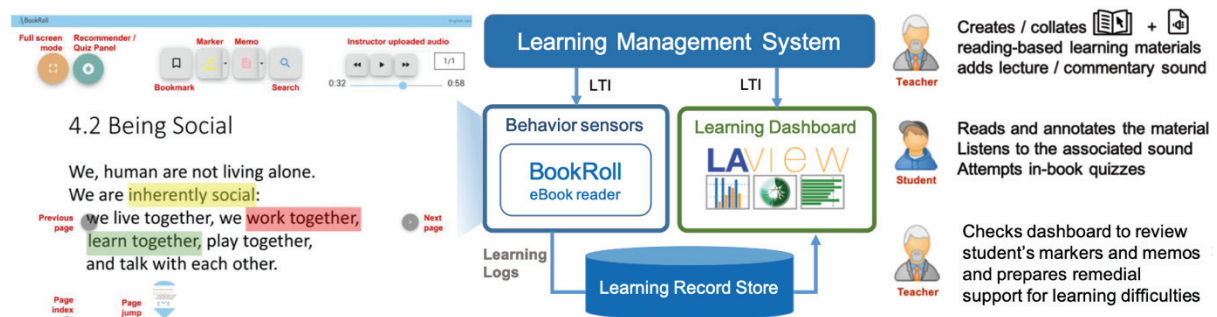


Figure 5. The reader's interface in BookRoll system

### 2.1 BookRoll features and teaching-learning strategy to resolve some of the challenges.

**It is a challenging situation - difficult for many but accepted by all:** While the thrust of digitized learning materials makes it a core part of modern formal education here in Japan, the migration was gradual. Nevertheless, during this time, many teachers accepted and created their materials and used available resources for their course using BookRoll. In K University instructors for more than 140 courses signed up to use BookRoll for their course in the Spring 2020 semester. At school, the system usage went up to more than 1000 unique users logging in every day after 7 May.

**Connectivity and Digital divide issues:** Connectivity and the digital divide is an issue even in Japan. While the infrastructure was available in the Japanese school and universities, the same may not be the case at homes of the teachers and students. For schools, they issued nearly 360 Microsoft Surface tablets to all Junior High school students on the only day that the school opened in April. While this would provide the device, still the students required to have a stable internet connection at home to access the learning management system and BookRoll linked to it. A team supported the creation of accounts for all the students and verified network accessibility to the learning tools and materials. To tackle unfamiliarity, face to face teacher training was conducted for the school earlier this year. At universities, a series of online synchronized demonstrations informed the functionalities to participating instructors highlighting the new ones of uploading audio clips along with the reading material.

**A strategy to use BookRoll:** Based on the existing functionality, a teaching-learning strategy is proposed that can be adopted quickly while using BookRoll and the learning dashboard LAVIEW. An overview of system architecture, along with the teaching-learning strategy, is presented in Figure 7. Teachers can create their material and save them as PDF materials and the lecture or voice commentary as an audio file. When uploaded to the BookRoll platform, it is accessible from the learning management system. The registered materials can be accessed only by the enrolled students of any course, and the course instructor can control whether the students can download any material.

This feature helps the teachers to provide selected access to their copyrighted materials only with their registered students. The students then can read the material and hear the associated sound clip. Teachers can additionally give annotation-based exercises such as Topic-scanning guiding strategy for English as foreign language learning (Chen et al. 2019) or design learner centric approaches (<https://lcm-model.org/>) for their online class. The student's annotations and reading behaviors can be reviewed on LAVIEW, based on which remedial activities can be provided to the students if required.

### 3. Conclusion

Scholars have started observing this problematic period from the perspective of educators with different labels such as Emergency Remote Teaching (ERT) Hodges et al. (2020) or Panic-gogy (Kamenetz A., 2020). In this article, digital divide, uncertainty regarding student's participation in the online activities, and the increase in effort of the teachers to coordinate as well as modify their practices in a short period to a new online mode of teaching and learning are some of the common challenges during this period as found from the analysis of the response. This survey-based study captured an initial response of the educators to attempt and understand the problems in technology-enhanced learning during the dynamically evolving COVID-19 crisis. However, the findings helped to reflect on the technology affordances of the eBook-based teaching-learning platform during this pandemic period at least for the higher education sector. There remains further scope of investigating the issues faced by the teachers at K-12 level. Our current proposal of using BookRoll for e-books and audio -based learning has two main advantages to assist easy transition to online mode from the traditional face to face classes. It takes lower bandwidth to distribute learning materials than video-based learning activities and teachers can directly use their previously created content with the students. Further it provides easily trackable in-content formative evaluations using reflective questions or annotation-based activities.

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