



CiC NEXTBOOK

Co-created Interactive Courseware

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Intellectual Output 4: Onboarding of Eligible Courseware and Development of Interactive Modules

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IO4: Onboarding of Eligible Courseware and Development of Interactive Modules

After the pedagogical framework (O1) and the common infrastructure for co-creation (O2) were developed, suitable pilot courses were identified by project staff from each partner institution, and the associated courseware was converted to be used on the Nextbook platform. The authors (teachers) were provided with training material as outlined in O3. Educators adapted existing course materials to be used collaboratively. Examples of collaborative and interactive use of material on the Nextbook platform include:

- embedded videos that explain aspects of the material;
- the use of the common tools on the platform: highlighting, comments and questions. Students used all of these and were able to create threaded question-and-responses in order to effectively collaborate and support each other;
- direct questions from instructors to go with the text to prompt student thinking and interaction;
- students having visual prompts and interaction supports their understanding of how much of the course material they have accessed or completed;
- they can also see their level of engagement with respect to their peers or against teacher expectations. Levels of activity, progress, achievement, etc. can all be imbued with this positionality (Broos et al., 2017);
- viewing their individual activity can provide insights into the activity that a student has engaged in, perhaps helping students to see what they are yet to do as well as the time allocated on tasks and how they could improve their self-regulation of tasks, or to self-identify what they have struggled with (Santos et al., 2012; Nakahara et al., 2005);
- social interactions among the stakeholders (Buckingham Shum and Ferguson, 2012; Charleer et al., 2017; Chen et al., 2018) can be identified. This may be represented on a dashboard simplistically as the number of interactions (comments, questions etc.) or, perhaps more usefully, as identifying the most common peers that a student interacts or chats with, in order that they can identify strong working practices or encouraging supportive relationships;
- working synchronously (whether intentional or not) allows students to be alerted to items or discussions that are currently “hot”, i.e. being worked on by other students/teachers in-the-moment so that they could join those discussions.
- The platform infrastructure is designed in such a way that the interactive textbooks can be easily extended with additional types of content.

The use of Nextbook to support online teaching and learning is clearly transferrable to multiple contexts, as it was used by practitioners across a wide range of fields, from teacher education to chemical engineering. The underlying principles of the collaborative, social and dialogic construction of shared meaning and understanding, as discussed in IO1, and the potential for learning analytics to support student and teacher understanding of the effectiveness of the teaching and learning taking place (IO2) make this element of the project the most impactful and transferable. The principles are also applicable across any platform with the ability to host multiple synchronous and asynchronous users and that allows them to highlight and comment on the material provided, meaning institutions are not tied to the use of Nextbook. However, this platform has been specifically designed to allow this functionality following intensive iterations

of feedback from the pedagogic framework and the learning analytics stages, and from multiple participant perspectives at conferences and workshop events.

Onboarding of eligible courseware

Throughout the duration of the project, the process to onboard courseware material has been drastically improved, simplified, and automated. At the onset of, one of the main hurdles in the use of Nextbook was the “human in the loop” process for uploading content. Content had to be emailed to a Nextbook contact person, and who had to touch up the content until it was suitable for conversion, which was done by manually running a conversion script that transforms and uploads the content to the database via a secure connection.

Inspired by the abundance of feedback received when (and prior to) running the pilot classes, the onboarding flow was improved in several aspects:

- The conversion algorithm was made more resilient, reducing instances of unexpected failure to the point that it was suitable to be used in a non-supervised capacity
- The conversion algorithm was extended to accept more types of content. Whereas initially, Word documents containing basic titles and formatting could be interpreted, the current iteration properly handles rich types of content, from captioned images and tables with merged cells, footnotes and endnotes, to multiple-choice questions and fill-in-the-blank-type answers — which are automatically turned into student-answerable forms.
- The content conversion script is now directly integrated into the Nextbook platform, where it was previously run as a command-line script on a developer machine. This takes the human out of the loop, which achievement is an important milestone in the long-term sustainability of the project and enables cost-free digital publishing.

Development of interactive modules

Several interactive modules were developed to enrich the digital textbooks provided via Nextbook:

- The pre-existing annotation features (highlighting, note-taking and commenting) were further improved to support the needs and preferences of the educators who adapted their course materials to the platform.
 - “Groups” were introduced as a way to segment students into virtual classrooms. These segmented groups have been used both to distinguish between students who consume the same courseware in a different academic year, and to split up groups of students that study the same courseware concurrently, so that the questions and answers posted in one group are not visible in the other groups.
 - An “annotation” mode was introduced to more easily (i.e., with an “active” cursor, with fewer clicks) highlight text, add notes, or ask questions.
 - The commenting interface was improved to be usable on mobile devices
- Multiple-choice questions were introduced, allowing students to easily respond to textbook questions, and allowing educators to see the aggregate results.
- Freeform-text question modules were introduced. These provide educators with an immediate overview of the answers submitted by their students.
- A text-to-speech interface was piloted, which enabled students to listen to the course text, using AI-based speech synthesis in the language of the book. This experiment ran for

several months, but has been shelved for the time being, because it turned out not to be actively used by the students in the participating classes.

- Textbooks on Nextbook can now contain videos, which can be uploaded by the authors themselves.