BBookX: Building Online Open Books for Personalized Learning

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Abstract
We demonstrate BBookX1, a novel system that automatically builds in collaboration with a user online open books by searching open educational resources (OER). This system explores the use of retrieval technologies to dynamically generate zero-cost materials such as textbooks for personalized learning.

Introduction
Textbooks play a crucial role in both the teaching and learning process. However, in practice, textbooks have several issues. Authoring a new textbook usually requires a great amount of time and effort, even for experts. A tool that facilitates the book creation process could be very helpful. It is not easy to keep an existing textbook up-to-date, especially for fast changing domains such as computer science. For example, most existing machine learning books as of this date lack recent developments in deep learning. However, most of such information can be found in OER, such as publicly available scientific papers, lecture notes, Wikipedia, etc. For certain classes, teachers may want to modify the book content, change the order of sections, or combine content from different books. This can give flexibility for designing personalized textbooks.

To deal with these issues we propose BBookX, a novel collaborative computer facilitated textbook creation system. Designed to utilize information retrieval techniques to intelligently harvest existing OER, BBookX is currently built on top of Wikipedia. However, it can also incorporate other available OER.

BBookX has an interactive Web interface that supports real-time book creation. Given a set of user-generated criteria, it returns a list of relevant material that can be put into the book. Users can accept, reject, or reorder the returned results. Such feedback allows the system to reformulate the query in order to return better results. In addition, BBookX can create an open version of existing textbooks by automatically linking their existing book chapters to Wiki articles.

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1https://book.tlt.psu.edu/
The book building process first requires adding a book title. Built books in the “Library” or start building a new book. They can then choose to keep working on previously created books or start a new one. As shown in figure 2a, users can then click the “Add Chapter” button to work on a new chapter. Figure 2b shows the interface to add a chapter. After creating a chapter title and adding a short description which can be keyphrases or sentences, users click the “Run” button to let BBookX retrieve a list of relevant OER. When the system finishes searching, users can review each result by clicking the links that allow a preview in a new browser tab. Users then click the results they wish to keep and add them to the “Saved Results” list. If users are still not satisfied with the results or want more relevant OER, they can click “Regenerate Results” to re-run the search. User feedback is utilized by the system to reformulate the query for other results. In addition, BBookX supports reordering OER or chapters by dragging and dropping. The built books can be exported as text files for further editing or as HTML for embedding in other Web pages.

### Existing Systems

To our knowledge, other existing textbook building systems do not support the automatic retrieval and organization of OER, but require manually attached related resources. For example, Wikibooks offers a wiki-based platform allowing users to create books collaboratively. FlexBook is a textbook authoring platform where users produce and customize the book content by re-purposing educational content.

### Conclusions and Future Work

We introduced BBookX, a novel collaborative automatic textbook building system designed that makes use of available open educational resources and applies simple but useful information retrieval methods that facilitate a textbook authoring process. Currently we are working on incorporating prerequisite relations among concepts (Liang et al. 2015b) into BBookX, which aims to increase the coherence of the book.

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### References


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6http://www.ck12.org/