

# DESIGN OF A TOOL FOR CREATING ACTIVITY-BASED LEARNING OBJECTS

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In this study, we present the design and development of a novel tool for creating activity-based learning objects (LOs). The primary focus of the tool is to create various activity-based objects for experimental learning or learning by doing, and to provide many learning services as a real e-book combined a textbook and notebook, we called it Enook (Evolutionary note book), that paperback books can never provide. The second is to manage all aspects of live instructor-led classroom training on the network environment such as Web and mobile. The tool can be used to receive feedback from students about the quality of the lessons during courses in academic institutions, and instructors can use the tool to build LOs, manage their courses, and contact learners. The third focus is to make use of learning data. The tool includes many modules that could express the learning activities of each student into the data. Learning data can be used to monitor the level of students' understanding of the material and to provide meaningful information through learning analytics.

The tool is a new-concept software platform that can be used to create interactive and data-rich educational environment. The structure of Enook is divided into two levels: server and client side. Server side environment is the integrated framework to develop interactive LOs. Based on the framework, LOs are created in client side using dynamic HTML and JavaScript with a rich text editor, and the learning services can communicate over the Internet by a standardized protocol. The tool emphasizes instructor-to-students (students-to-students, learning objects-to-users) communications based on learning activities. Some core features of the tool are:

- Combining LCMS and CrMS: Enook provides CrMS (Course management system) features as well as LCMS (learning content management system) functionalities. Instructors can create, reuse, manage, and deliver learning objects in the tool.
- Reusability of object components: Users can insert JavaScript modules into learning contents to create interactive learning objects and the tool provides many component modules. In addition, Enook can use existing JavaScript objects developed in other applications and educational systems. This function is helpful in speedily generating learning contents. It supports to easy reusability of the learning objects developed for a course in other courses on the tool.
- Activity-based e-book: E-books need not be restricted to duplication of the printed page on a digital device. They should incorporate a variety of learning activities and cloud-based resources such as immersive simulation environments for practice, collaborative/individual homeworks, and adaptive testing and assessments. Enook can create various activity-based objects for experimental learning or learning by doing.
- Viewers for learning contents: Enook provides a couple of viewers. It will help instructors easily use the pre-existing learning contents with other file formats such as PPT, PDF, and Video.
- Platform independent: The tool is platform independent. The environment is targeting on operating systems as well as devices independent.

Enook is currently being developed and we are attempting various experiments on the usefulness of the tool by applying it to many classes. Instructor's observations and student surveys show that Enook has proven to be an effective authoring and learning tool. Students benefit in that they achieve enhanced understanding with learning activities. Instructors attain immediate feedback about whether students have understood a particular concept before moving on to another topic, and students rated the feedback system as fresh and innovative.

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