ELMS Learning Network: An EdTech Platform for Sustaining Innovation

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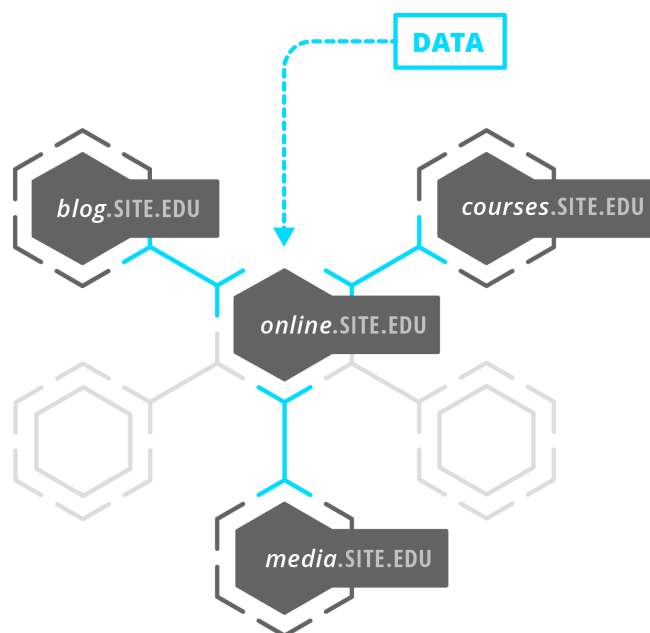
Figure 1: *ELMS Learning Network Suite-of-Tools*

1 Introduction

ELMS Learning Network (LN) represents a radically different approach for the development and deployment of online education technology. ELMS Learning Network is an open-source technology platform designed to foster and sustain online education innovation. Instead of offering educators an all-inclusive tool for online learning, commonly known as a learning management system (LMS), we have designed a system that assimilates emerging technology and pedagogical innovation through an extendable, networked suite-of-tools approach (Fig. 1) that can be tailored to the needs of the organization implementing the system.

A key differentiator from other open-source EdTech projects is that ELMS LN is designed to be developed collaboratively while sustaining individual permutations of the system, whereas other open-source EdTech projects culminate in the creation of a single expression of a technology. ELMS LN balances standardization and customization by providing an open-source core codebase and a workflow for sustainably supporting customizations. Customizations have included alterations of the default user interface and additions of entirely new database-driven tools.

2 Technology

Built on open-source software called Drupal, ELMS LN leverages the work of the Drupal developer community, web service specifications, and automation technology developed for the project. An example of automation technology developed for the ELMS LN project is Drush Recipes. A Drush recipe enables a user to perform complex tasks such as configuring and deploying a Drupal-based CMS and configuring security best practices through a web-based user interface.

Education technologists can build and deploy new tools in a patterned fashion by creating a new Drush recipe. The recipe can then be shared with other learning organizations, helping to share and test new ideas. ELMS LN takes advantage of additional automation that simplifies complex server administration tasks, eliminating the need for a large IT support staff. The ELMS LN development team makes heavy use of DevOps to foster project collaboration and development. Continuous integration techniques are used to perform automated testing for code integrity and system installation stability.

3 Functionality

A new course or course section is created through a web interface that instructs the system to build a selection of networked tools. For example, if a course designer wants a course to include a blog, an immersive 3D environment, and text content, they would select only those tools from a list on a course setup form. When the setup form is submitted, the system will build the course tools based on the selections. The tools are networked together to share data and a common interface provides a seamless user interaction experience for students and course authors. Students and instructors can be automatically synced with a course instance with data from a directory service such as LDAP. Every course created with ELMS LN has its own cluster of tools based on the desired pedagogical strategy.

The need for this project comes in part from the inflexibility of existing LMS solutions. The chosen LMS solution either has all of the features needed for the course, or it doesn't and drives faculty to turn to other online technology. Incorporating other online technology as part of an online course can be problematic for both instructors and students as this introduces unknown implications to Personally Identifiable Information (PII), accessibility, FERPA, technical support, and more.

4 Impact

The ELMS LN project provides powerful, flexible, and free technology that supports online learning in whatever current or future form it may take. The technology developed for the project is repurposable, and has been used extensively by the Drupal community, having been downloaded over 780,000 times, and is reportedly installed on over 12,000 Drupal systems. ELMS LN is currently being used and developed by multiple departments at Penn State University and University of Wisconsin-Madison.

The ultimate goal of the project is to remove the need for a developer to produce online-course technology, and instead provide tools that educators can use to directly create, implement, and share innovations as they occur.

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