How to Create an Online Repository of Learning Objects using Wordpress

James M. Cook
University of Maine at Augusta
46 University Drive
Augusta, ME 04330
207-621-3190
james.m.cook@maine.edu

ABSTRACT
This paper outlines a series of steps by which any scholar or group of scholars may create and disseminate an online repository of “learning objects,” small-scale multimedia offerings designed to build skill and knowledge. Wordpress software on a web server is modified with plug-ins to present such learning objects and organize them by categorical taxonomies, keyword folksonomies, organic user search and series of intentional “courses” that link objects for cumulative learning. Additional modifications allow for assertion of ownership through Creative Commons licensing and for peer review in a community of teaching as scholarship.

Keywords
learning objects; learning repositories; wordpress; pods; peer-review; academic freedom; online education; higher education

1. INTRODUCTION
Colleges and universities in the United States are experiencing a rapid shift away from in-person to online learning, but the structure of online learning still strongly resembles the classical form with its physical restrictions. Whether in official coursework for credit or in unofficial Massively Online Open Courses (MOOCs) such as Coursera or EdX, online education is still framed by an opening date, a closing date, and months-long aggregations of learning, an artifact of a semester organized around residency on a physical campus. How well does that approach work? Only 6.5% of those who register for a MOOC complete the coursework [1]. In part, this figure may represent substantive failure by students, but it also reflects the reality that many online learners are inclined to learn in units smaller than the semester. Learners are beginning to demand that we kill the course and replace it with something smaller, more granular structure amenable to their perceived needs [2].

Above the level of students and faculty, the University of Maine System has an interest in offering a more granular format of online education. In 2030, the proportion of non-traditional learners with non-traditional schedules will be even higher than it is now. Those learners will demand information and skills be taught in smaller, more tailored units. These learners will be ever-more savvy at obtaining such skills and knowledge from other sources if the University of Maine system does not oblige them. As state government withdraws direct budgetary support for higher education in Maine, and as the proportion of the population interested in traditional semester-grounded courses shrinks, the University of Maine system further restricts enrollment when it restricts itself to traditional formats that may be unattractive to non-traditional learners. For this reason, the Adult Baccalaureate Completion/Distance Education Committee [3] recommended changes in teaching to “address the unique needs of adult students,” with “professional development” and “online program development… into new modalities.”

At the same time, faculty have faced pressure from some administrators to deprofessionalize, standardize and submit to regulation of the content and form of their teaching, a move that strongly departs from norms of academic freedom. The online environment allows faculty to sidestep these pressures. Due to the emergence of inexpensive, accessible online venues, faculty are no longer dependent upon university infrastructure as a platform for communication. Any faculty member or faculty group with fifty dollars a year to spare can create an independent educational space free of administrative limits, free of arbitrary units of space and time, free of tuition burdens for students, and free of boundaries between authors, disciplines and courses.

This paper outlines a series of steps by which any individual, department, or network of scholars in higher education may create an online repository for so-called learning objects, small-scale combinations of text, video, imagery and interactivity that build skill and knowledge. Each step is described in broad detail, with links to more specific instructions where needed. I am also happy to consult with interested users for non-profit purposes.

2. WORDPRESS ON SHARED WEB HOSTING
A useful online repository for learning objects must be placed in an environment broadly accessible to faculty with varying amounts of technical expertise and experience. Fortunately, as the Internet has matured, a number of such environments have become available. This paper focuses on the content management system Wordpress, available at no additional cost on nearly any shared web hosting service.

2.1 Obtain Shared Web Hosting with CPanel
Shared web hosting is an Internet service in which a company provides space and software on a server from which a website is offered to users from the world. Free web hosting on services such as Google Sites has the advantage of easy access but does not allow users to make many changes to the underlying software used to
deliver web pages. At the other extreme, dedicated servers and virtual machines provide near-maximal control to users but are difficult for non-experts to master. Shared web hosting with a control panel (CPanel) splits the difference, offering the ability to customize web page presentation in a user-friendly desktop-like environment. CPanel shared web hosting is also inexpensive, currently available for roughly $50 a year.\footnote{All references to cost and illustrations of service are based on experience in Spring 2016 with two popular, stable web hosting services, fatcow.com and asmallorange.com.}

Once a shared hosting plan is obtained\footnote{All references to cost and illustrations of service are based on experience in Spring 2016 with two popular, stable web hosting services, fatcow.com and asmallorange.com.}, the Wordpress content management system can usually be installed with a simple click of an icon:

![Wordpress Installation in a CPanel Environment](image)

Figure 1. Wordress Installation in a CPanel Environment

Details and trouble-shooting assistance for the installation of Wordpress using CPanel are available online from Wordpress\footnote{All references to cost and illustrations of service are based on experience in Spring 2016 with two popular, stable web hosting services, fatcow.com and asmallorange.com.}.

2.2 The Wordpress Environment

According to the plan described in this article, learning objects will be written using Wordpress; how does the Wordpress environment work? Those familiar with a word processor should be comfortable with the most central element in the Wordpress composition environment – a large box (Element A in Figure 2) into which an author may type content. That content is given basic context with the addition of a title (Element B) and standard formatting (Element C) that includes bold type, italic type, lists, blockquotes, justification and hyperlinks.

Moving beyond standard word processing format, Wordpress also allows authors to add various forms of media (images, audio, video, attached documents for download) through an intuitive “Add Media” button (Element D). Two kinds of written documents are built in to the Wordpress environment: “posts” are organized by the date and time of their publication, while “pages” are not assigned a time or date. Both posts and pages, however, may be classified according to “categories” (Element E) and tags (Element F).

Categories are an organized and possibly hierarchical set of terms determined in advance; tags, on the other hand, offer a free-form approach to categorization in which keywords are entered every time a page or post is written. Both the former “taxonomy” approach and the latter “folksonomy” approach have been recently introduced to academic journals for effective scholarly searches\cite{5, 6}, indicating a basic compatibility between Wordpress and academic publishing.

![The Unmodified Wordpress Environment](image)

Figure 2. The Unmodified Wordpress Environment
Websites written in Wordpress need not be written and curated by one individual alone. Multiple users, each with their own username, password, and profile, may sign up for accounts with one Wordpress site, with different kinds of users possessing varying privileges ranging from the right to modify website design and regulate other users (“administrator”), down to the more narrow right to review and revise others’ contributions (“editor”), and down further to the narrow right to write new articles of one’s own (“author”). To make a Wordpress website more collegial, an administrator may invite and classify new users using the “Users” function in the Wordpress settings bar (Element G in Figure 2).

To access the control panel shown in Figure 2 from which new web page content can be written and published, simply visit http://yourwebsitename.org/wp-admin and enter your username and password. Most installations of Wordpress will also feature a “login” link on the front page of the websites they create.

More detailed information on the Wordpress writing environment, user privileges, and best practices for writing with Wordpress options is available online [7,8].

3. MODIFYING WORDPRESS WITH PLUGINS

3.1 A More Complete Academic Environment for Learning Objects

Section 2 describes a standard Wordpress writing environment, one that is used for applications as diverse as personal blogs, online magazines, and online shopping. However, particular needs for a repository of learning objects go unmet by this standard configuration. Fortunately, Wordpress is capable of being extended by additions to its software called “plugins.” With the addition of just two plugins, Wordpress can be modified to create a website designed around a learning repository that recognizes authors, expands classification options, makes virtual space for learning outcomes, and enables peer review.

To enable these features, simply click on the “Plugins” link in the Wordpress settings bar (Element H in Figure 2). In the pages that follow, as shown in Figure 3, click the “Add New” button, then type in the name of the desired plugin in the “Search Plugins” bar. When you have found the desired plugin, click “Install Now” and finally “Activate Plugin.” Detailed descriptions of automatic plugin installation, manual installation alternatives, and troubleshooting are available online [9].

3.2 Authorship: the Creative Commons Configurator

Broad dissemination of scholarly material is an academic tradition, but this tradition has been crucially paired with the understanding that scholarly work will be properly credited. Installation of the Creative Commons Configurator facilitates the continuation of this tradition in the publication of learning objects [10]. This regularly-updated plugin currently features a variety of Creative Commons 4.0 license statements from which an author may select when publishing the learning object they have created, granting or reserving various rights of republication as the author sees fit. After installation of the Creative Commons Configurator, it is possible to ensure that Creative Commons licenses are visible on all learning object pages by visiting the plugin’s “settings” page and enabling all “text block” options.

3.3 Fuller Fields, Learning Outcomes: Pods

While the Creative Commons Configurator inserts a pre-set field into the page on which a learning object is written, a more flexible Wordpress plugin called Pods allows an administrator of a learning object repository to add as many custom fields as desired, representing as many varieties of academic information as desired, including unique varieties of taxonomies, posts or pages [11]. Existing Wordpress information fields may also be altered using the Pods plugin.

Configuration of the Pods plugin, through a special “Pods Admin” link generated on the Wordpress settings bar, is perhaps the least intuitive experience of all the configurations described in this article. Regardless, the use of the Pods plugin is nearly essential because it enables the addition of special academic elements that enable an author to fully develop a learning object and enable a user to fully experience that object as a distinctly academic form. Extensive documentation and user tutorials are available at the pods.io website [12].

3.3.1 Creating Pods

In the parlance of the Pods plugin, a “pod” is a special kind of post, page or taxonomy. To create a fully academic learning object repository, I suggest creating an entirely new kind of “Custom Post Type” called a “Learning Object.” To accomplish this, complete these steps in order:

1. Select “Pods Admin” from the Wordpress settings bar in the control panel.
2. Click “Add New Pod.”
3. Click the “Create New…” button.
4. Select “Custom Post Type (like posts and pages)” in the Content Type field.
5. Write “Learning Object” in the Singular Label field.
7. Click “Next.”

3.3.2 Creating Spaces for Learning Outcomes and Peer Review in Learning Objects

Once the “Learning Object” has been created in the step above, you’ll see that “Learning Objects” appear as a new kind of content that you can create in the settings bar of your Wordpress control panel. However, if you click “Add New” under “Learning Objects,” you’ll notice that it looks just like any blog post. But learning objects are more than blog posts in two ways. First, they should
contain a statement of *learning outcomes* that describe what a student will be able to do after completing the learning object’s experience. Second, to the extent that a learning object is a scholarly creation, it is best if that object is made available for *peer review*. To create text boxes that allow learning outcomes and peer review comments to be entered, complete these steps in order:

1. Select “Pods Admin” from the Wordpress settings bar.
2. Hover your cursor over the “Learning Objects” pod, then select the “Edit” link.
3. Under the “Manage Fields” tab, click “Add Field.”
4. Under the “Basic” tab,
   - enter the Label “Learning Outcomes,”
   - enter the Name “learning_outcomes,”
   - enter some descriptive text for a Description (such as “Describe the Learning Outcomes for this Learning Object. Upon completion, the successful learner will...”)
   - select WYSIWYG under “field type.” This will allow an author to format text and add media as appropriate.
   - click the “Add Field” button.
5. Repeat steps 3 and 4 to add fields for peer review. If you would like to add spaces for three peer reviewers to make comments, for instance, add the fields “Peer Review 1,” “Peer Review 2,” and “Peer Review 3.”

Figure 4. The Modified Wordpress Environment
3.3.3 Creating Taxonomies and Folksonomies for Learning Objects

Adding fields is an important step, but it is also important to add classifying taxonomies and folksonomies. Academic disciplines characterize themselves by well-defined, pre-existing broad disciplines and specific subjects. In turn, particular learning objects teaching particular lessons may be described by unique keywords. To add the taxonomy “Academic Subjects” to the “Learning Objects” pod you have created, for instance, complete these steps in order:

1. Select “Pods Admin” from the Wordpress settings bar in the control panel.
2. Click “Add New Pod.”
3. Click the “Create New…” button.
4. Select “Custom Taxonomy (like Categories or Tags)” in the Content Type field.
5. Enter “Academic Discipline” in the Singular Label field and “Academic Disciplines” in the Plural Label field.
6. Click “Next.”
7. Under the “Advanced Options” tab, check the “Learning Objects” box in the “Associated Post Types” section.
8. Since this is a taxonomy, check the “Hierarchical” box in “Advanced Options.”
9. Click “Save Pod.”
10. When you create a new Learning Object, look for the “Add New Academic Discipline” option. Use this option to add broad categories of academic disciplines such as “Humanities” and to place sub-disciplines such as “Philosophy” underneath those broad categories. You may then check whichever disciplines appropriately describe any particular learning object.

The same procedure could be followed to add a taxonomy option for more particular academic subjects, to add a taxonomy option to describe categories of learning object formats such as “video,” “audio,” or “text,” or to create a folksonomy option to hold keyword tags. Once created, the modified Wordpres writing environment will resemble Figure 4 (new features marked with blue dots).

3.3.4 Creating Templates to Position Learning Object Elements on a Published Page

Once the Wordpress environment has been modified to create a page on which learning objects can be written, learning outcomes can be added, and appropriate taxonomies can be used, the addition of learning outcomes may begin. However, to make all these elements actually appear on a published learning outcomes web page, it will be necessary to take one more step: adding templates that describe where all of this information should be placed on the page. To add templates and place this information on your learning object’s web page, complete these steps in order:

1. Select “Pods Admin” from the Wordpress settings bar.
2. Select the “Components” sub-option from the Wordpress settings bar. Hover over the heading “Templates” and make sure the Templates option is enabled. If the “Templates” option is disabled, click the “Enable” link.
3. Select the “Templates” sub-option from the Wordpress settings bar.
4. Click “Add New.”
5. Enter “Learning Object” in the title bar for the Template.
6. Assuring you have taxonomies and folksonomies for keywords, academic disciplines, academic subjects and formats, enter the following text for your Template in the main text box:

```
<hr><h2>Learning Object Metadata</h2>
<ul><li>Keywords: [@keywords]</li></ul>
<ul><li>Academic Disciplines: [@academicdiscipline]</li></ul>
<ul><li>Academic Subjects: [@academicsubject]</li></ul>
<ul><li>Formats: [@format]</li></ul>
```

7. Save the Template.
8. Select “Pods Admin” from the Wordpress settings bar.
9. Hover over the “Learning Objects” pod and click “Edit.”
10. In the “Auto Template Options” tab:
    - Check the “Enable Automatic Pods” box.
    - For the “Single item view template” option, select “Learning Object.”
    - For the “Single Template Location option, select “After.”
    - Click “Save Pod.”

4. ADDING AN INDEX PAGE

As a cap to all these steps, a home page should be created that lists all of the learning objects that have been created for a repository. If a learning object repository contains a large number of learning objects, then it may be prudent to write a computer program to automatically generate such a list and output that list to a Wordpress page. Tutorials teaching such advanced techniques are available online [13]. However, for smaller learning object repositories, a simpler option is to write a regular Wordpress page containing links to all learning objects in the repository. Following links in the Wordpress settings bar from Appearance to Customize and in turn to Static Front Page, select “Front page displays… A static page.” Finally, select the page you have just written in the “Front Page” dropdown menu. That page is now the “index page” for the repository, the first page a visitor will see when they type in the address of your website.

5. CONCLUSION

This paper has outlined specific steps by which scholars may launch their own repositories of learning objects online with relative ease and a minimal budget. Although the steps described above vary in length, they can all be completed by any scholar without specialized training. The result is a scaffold, a structure upon which a variety of learning objects may be placed.

As an example of what is possible to create through these steps, I have created a website entitled Maine OSLO, an Open Structure of Learning Objects, at http://maineoslo.net. That website contains sample learning objects incorporating various forms of multimedia and interactive content, and also includes an extra mechanism by which it is possible to connect learning objects to one another. The goal is to enable a rethinking of the “course” from one semester-long experience taught by a single faculty member behind brick walls or paywalls into a new form, of varying length, taught by multiple faculty of multiple disciplines and perhaps multiple institutions, working together to connect and cumulate learning for
students who pay tuition and learners who do not. I welcome your feedback on maineoslono.net and invite your thinking about what a better model might look like.

Whether an open, collaborative, faculty-driven repository for learning objects gathers and connects materials in large or small volume, wide breadth or specialized depth will be determined by the extent of organizing and mobilizing by faculty. For generations, we have been separated from one another by courses, each teaching in a manner invisible to one another. Now that technology renders such separation unnecessary, cultural tradition may nevertheless keep us apart. For those who choose to connect and share work in an environment of unregulated academic freedom, practical options such as the one described in this article should be made available and further developed.

6. ACKNOWLEDGMENTS
I am grateful to instructional designer Mina Matthews for a year of expert guidance and to the staff of University College for indispensable feedback in the development of a broader project of which this paper is a part. This paper does not necessarily reflect the viewpoint of University College, University of Maine at Augusta or their employees.

7. REFERENCES