Information Literacy in Learning Landscapes: Flexible, Adaptable, Low-cost Solutions

Introduction

Today's college and university learning landscapes are dynamic and characterized by increased student demand for highly flexible and self-paced online learning opportunities. Recent fiscal conditions in higher education make learning landscape development more challenging due to finite resources and competing priorities. Similarly, academic libraries are experiencing substantial budget and staff reductions. Despite these trends, academic libraries are in a strong position to contribute to surrounding learning landscapes by expanding student online learning opportunities and promoting the critical use of information. Evolving learning technologies available for free or at low cost provide higher education and libraries with the tools to respond to this fluid environment.

Arizona State University (ASU), one of the largest public universities in the United States, promotes a strategic focus on transdisciplinary curricula and escalating online programs. In response to these conditions, ASU Libraries shaped online learning to align opportunities for information literacy instruction within online, blended and face-to-face courses. This article outlines the processes, considerations and criteria used to choose free and low cost solutions for creating, managing and providing access to learning content developed within ASU Libraries.

Background

Arizona State University, the New American University, is implementing a new model for higher education, committed to academic excellence, entrepreneurial energy and broad access. Transdisciplinary research, specifically blurring the lines of traditional academic disciplines, is the driving force behind the new model. ASU is a single, unified institution comprised of four campuses across the greater Phoenix metropolitan area and currently serves more than 70,000 students (over 56,000 undergraduate and 13,000 graduate students) [I]. The ASU Online program is one recent effort to increase access to education and the goal is to enroll 100,000 students by 2020 [II].

ASU Libraries is comprised of eight libraries housed on the four physical campuses of Arizona State University. Its collection contains over 4.5 million volumes and a full array of digital resources. The Libraries' web site at http://lib.asu.edu provides access to the online catalog, 325 research databases, over 325,000 e-book titles and 78,000 full-text electronic journals. The library's discovery service *Summon*, branded as Library One Search, searches many of these research materials and the Ask a Librarian chat service provides 24/7 research support. More than 200 librarian-crafted customized research guides on specific subjects, courses and current hot topics also support ASU's learning landscape.

Literature Review

Learning landscapes encompass a selection of environments in which students interact and learn (Thody 2008; Dugdale 2009). Thody (2008) posed this working definition: "University learning landscapes are conceptually holistic, loosely coupled interconnections of all formal and informal, on and off-campus, virtual and physical

facilities, sites and services and how stakeholders use them. A learning landscapes approach is distinguished from mere site management by ...conscious decisions to manipulate all these traditional and innovative facilities so they are continually, and ubiquitously available, collaborative opportunities to enhance learning" (p13). Dugdale (2009) also suggests that learning landscapes should "maximize encounters among people, places and ideas." (p52).

E-learning

E-learning has become common practice in higher education learning landscapes in recent years and shows promise for addressing issues of scalability while helping students achieve learning outcomes (Clark & Mayer, 2007; Leacock & Nesbit, 2007). The majority of e-learning tools described in the educational technology in higher education literature support formal online courses. However, these tools also have applicability for supporting blended and face-to-face classrooms. Studies indicate that e-learning is often as effective as face-to-face instruction, offering colleges and universities more options for delivering curricular content (Clark, Nguyen & Sweller, 2006; United States Department of Education). Findings of an extensive meta-analysis of online learning studies conclude "instruction conducted entirely online is as effective as face-to-face but no better" (U.S. Department of Education, 2010, p18). Another study by Figlio, *et al* (2010) was critical of the Department of Education's conclusions indicating that few studies reviewed in the meta-analysis offered direct comparisons of the effectiveness of online learning. Reporting on their direct comparison, Figlio, *et al* (2010) concluded that the relative benefits of "live versus online education is... tenuous at best" (p4). Further experimentation is needed to make claims regarding which mode

of instructional delivery is better. Regardless of the instruction mode, studies indicate that many students are satisfied with using online, self-paced learning options (Kammerlocher, 2009; Artino, 2007).

Libraries experience success in developing and using video tutorials to deliver information literacy instruction. Zhang (2002) asserts, "by focusing on information literacy skills and developing independent learners through effective use of Web-based technologies, librarians can play an important role in higher education of the information age" (p358). One fundamental question about e-learning is whether or not students learn and retain information literacy skills and knowledge gained through online environments. Studies by Anderson and May (2010) and Kraemer, et al (2007) specifically investigate the effectiveness of library instruction in online, blended and face-to-face settings. Their findings indicate that there are minimal differences among learning platforms in student retention of information literacy.

Learning Objects

Over the past 10 to 15 years, small discrete learning objects that can be reused in a variety of disciplines or learning environments have emerged as a significant approach to e-learning. These objects enable self-paced learning of content on demand. Wiley (2003) defines learning objects as "any digital resources that can be reused to support learning" (p. 6). Reuse is an important aspect of a scalable learning landscape flexible enough to efficiently support diverse learning needs. The ability to recontextualize and adapt learning objects for a variety of purposes is another important attribute (Koppi, et al 2005; Margaryan & Littlejohn, 2008).

Tutorials are the most commonly created learning objects in libraries (Mestre, 2011). However, developing and implementing learning objects is complex and is driven by available resources when delivering an online information literacy program. A 2008 *Survey for Learning Object Integration* administered by Online Learning Research Committee of ACRL's Education and Behavioral Sciences Section highlight respondents' instructional technology concerns including support, sustainability, storage, functionality, platform interoperability, customizability, reusability and accessibility. (Mestre, *et al*, 2011, p. 247).

Screencasting is a prevalent strategy for creating tutorials (Mestre, *et al,* 2011). Many articles describe the use of screencasting tools for library instruction, reference and staff training (Brown-Sica, et al. 2009; Carr & Ly, 2009; Meier, 2007; Silver & Nickel, 2007) and in recent years, free screencasting software has improved with recording quality and ease of use (Farkas 2009; Kroski 2009; Rethlefsen 2009; Slebodnik & Fraser-Riehle 2009; Sparks 2010; Steiner, 2010). Despite improvements in screencasting, librarians still need grounding in instructional design and online pedagogy to create quality learning objects. Unfortunately, Mestre *et al* (2011) found that limited support and training is available for librarians creating online learning objects. Brown-Sica *et al*. (2009) articulates that all audiences, whether it be students or our library colleagues, can benefit from screencasts which quickly respond to users' needs, either online or on-campus, and at any time of day. With the development of more screencasts and other learning objects, the need to manage the output increases, requiring more attention on storage and accessibility issues.

Learning Object Repositories

A learning object repository is an online collection of digital content that facilitates access to small units of educational information or activities (Lehman, 2007). Mardis & Ury (2008) stress the importance of creating a library of learning objects to facilitate their reuse. In their example, Mardis and Ury (2008) provide a table of categorized learning objects accessible via direct web links, some of which are listed on a library web page [III].

Repositories can be hosted locally however, many libraries rely on collaborative learning object collections, such as ANTS (ANimated Tutorial Sharing Project) [IV], MERLOT (Multimedia Educational Resource for Learning and Online Teaching)[V], PRIMO (Peer-Reviewed Instructional Materials Online Database) [VI], and CLIP (Cooperative Library Instruction Project) [VII]. These collections contain peer-reviewed learning objects which are vetted by other instructors; often they host the learning object or at least provide links to the learning object hosted on the developing libraries' site. ANTS requires that submissions be as general as possible to encourage re-usability. CLIP encourages users to download the tutorials and add institutional branding under the Creative Commons *Attribution Non-Commercial Share Alike* license. Though collaborative repositories have great value by providing opportunities to share, discover and reuse learning objects, review process and standards for inclusion can delay access to rapidly developed learning resources.

Learning Objects at ASU

The current learning landscape at ASU is evolving so rapidly that it could be characterized as a landscape with few absolutes. Traditional models of information literacy instruction no longer support the needs of our students resulting in ASU

Libraries' need to shape responsive and scalable learning options characterized by flexibility and adaptability. The Online Learning Workgroup (OLW) was formed to address the need for increased learning objects in response to larger class sizes, multiple learning management systems (LMS), and on-demand research and instruction assistance for students.

Older models of lengthy, inflexible tutorials no longer supported the needs of ASU's First Year Programs. The ASU Libraries' New Student Workgroup (NSW) proposed a series of learning objects that introduced core information literacy competencies that could be placed in online library guides and LMS. OLW and NSW focused on conceptual, demonstration and orientation video tutorials. This represented a new flexibility emphasizing reusable learning objects rather than a large, comprehensive, single tutorial. Brief and discrete learning objects facilitated opportunities to better incorporate instructional design principles increasing the scaffolding of complex concepts and reducing cognitive load.

OLW began producing tutorials using the multimedia software *Captivate*. These learning objects required instructional goals and subject content from librarians, technical and design expertise, a transparent process for production, web space, and style guidelines to be successful. In consultation with faculty, approximately a dozen concepts were translated into a series of core learning objects that were primarily used with first-year students. Basic quizzes were developed and linked next to each learning module on the library web site. Shortly after building the core set of learning objects budgetary constraints resulted in a reduction in staff and loss of technical expertise to produce and update learning objects in *Captivate*.

Concurrently, ASU experienced an explosion in its online learning presence with more than 25 degree programs launched within a year. Faculty from various academic programs teaching in online and face-to-face environments discovered the online learning modules and integrated them into their courses. However, the learning objects originally created to support first-year students were general and basic and at times, faculty needed their students to use more discipline focused learning content.

The convergence of rapidly developing programs, the need for on-demand subject specific instruction and an increased number of low-cost screencasting tools led to a decision to teach subject librarians to build their own learning objects. A team evaluated various screencasting software based on the criteria shown in Table 1 (Rethlefsen 2009a; Slebodnik & Fraser Riehle 2009; Sparks 2010):

Table 1: Criteria for software evaluation

Screencasting Software Packages	Free Screencasting Software
- ease of use (for recording and for viewing) - file output requirements (flash preferred) - Quizzing options - Cost	- Multiple login - Ease of use (ability to pause during recording and easy to find URLS) - File output requirements (SWF, MP4) - YouTube upload (closed captioning)

To enable the subject librarians, especially those without access to *Captivate*, to create their own screencasts, OLW evaluated the features (See Table 2) of several free screencasting tools (Sparks 2010) and ultimately decided to select *Jing* and purchase

limited subscriptions to Jing Pro. Jing Pro offered YouTube uploading options and the

ability to create MP4 files. OLW abandoned this decision when Articulate announced

the release of their free screencasting software, Screenr, launched in August 2009.

 Screenr offered the automatic YouTube uploading options and allowed the download of

MP4 files at no charge. Screenr is a web based product and allows multiple

simultaneous logins. The web based software was the perfect option for our multi-

campus working environment.

Table 2: Features of screencasting software applications

Jing Image http://www.jingproject.com/	Screenr image http://screenr.com/
Features:	Features:
• Local Installation • SWF Files • YouTube upload available with paid version • Screenshot, image editing and annotations	• Browser based • SWF & MP4 Files • Direct upload to YouTube • Download available after product is published

The librarian role and skill set in relation to the university learning landscape is

evolving. While multimedia design skills and an understanding of online pedagogy are

not absolutely necessary to develop learning objects, some training in these areas

improves the quality of learning content created. OLW launched a training program to

support librarians' ability to create screencasts on demand. The training featured

technical and design aspects of creating learning objects and how to locate and

manipulate images. The only requirement for each subject librarian is that they use a

beginning and ending slide branded for ASU Libraries. Otherwise, librarians used their own discretion to generate content and select images that best fit the student learning needs within their programs. Within six months of the training program subject librarians created approximately 100 learning objects to support curricular needs. Librarians also began to experiment with creating small learning objects to help answer questions on chat or e-mail reference.

Screenr succeeded in meeting the subject librarians' need to create on-demand tutorials but managing and organizing these videos quickly emerged as a priority. By using a single username and login (asulibtutorials), the Screenr site (http://www.screenr.com/user/asulibtutorials) became a temporary repository for all the screencasts developed in the ASU Libraries. As the collection grew, it became increasingly difficult to search and find tutorials for reuse in other courses. A "Community Toolkit" in ASU Libraries' intranet enabled librarians to share exercises, presentations and links to specific Screenr videos. However, this was strictly for internal use and inaccessible to faculty and students. While searchable, the "Community Toolkit" was not the best solution to host the tutorials. Librarians embedded learning objects into library guides, but again, only as links and not original hosted files. As the library became reliant on the free web-based screencasting software, it was important to develop independent hosting options. For example, one of the free screencasting options initially evaluated, Screentoaster (Sparks 2010), is no longer available (as of July 31, 2010) and all videos created from this website are not accessible.

The issues related to sustaining a set of current and relevant learning objects includes challenges such as maintaining currency and relevancy, implementing effective

learning outcomes assessment, gathering deep level analytics to evaluate the online learning program, and providing a convenient space for students and faculty to access learning objects. To date, options to address learning outcomes assessment have fallen short of our goals primarily because the ASU landscape is so varied and scalable solutions are limited. Librarians are currently exploring Google Forms as one way to construct small scale assessments within their academic programs.

The rapid development of learning objects also underscored a gap for faculty and students needing to locate and access the Libraries' learning content. Fortunately, a turn-key, lower cost solution existed in the form of open source repository software that required minimal staff resources to launch and maintain.

Learning Objects Repository

The purpose of the Learning Object Repository is to promote the dissemination of learning objects to faculty and students. Before the repository, the objects resided in various locations, existed in numerous formats, therefore, search functionality across objects impossible. To easily maintain the objects in one location, create format and metadata standards, and provide searching functionality across all objects, ASU Libraries created a locally controlled web publishing platform. Because of resource scarcity, this platform needed to be easy to install, develop, and maintain.

To select the repository, we assessed whether the functional requirements of the software packages met our foundational requirements. Simple side-by-side comparison, although minimally helpful, did not provide all the necessary information for choosing a software solution. For example Dspace [http://www.dspace.org/], an open source solution enabling content sharing, had metadata capabilities meeting our requirements,

but out of the box was designed as an institutional repository system disseminating text documents. We required a system designed specifically for collection of heterogeneous file types, including video, interactive Flash and PDF lessons over text. Eprints [http://www.eprints.org/], a similar repository solution, required considerable development to meet our performance requirements as did Drupal [http://drupal.org/], another open source software platform. Since we could not purchase new hardware, we based our choices on a system we could support with our current infrastructure and staffing levels.

Omeka [http://omeka.org/] was selected for all of the requirements listed above. Omeka is open source software "designed for libraries, museums and archives and scholarly exhibitions." Omeka allowed us to easily establish collection policies, procedures, and workflows and provided a simplistic submission and ingestion workflow. We were also able setup metadata schemas for our objects types to augment functionality using Omeka's built in tools.

Omeka provides functionality for rich object, item, and collection metadata which translates to optimal learning object retrieval. Using Omeka as a dedicated repository platform allows ASU Libraries to create collections and item level records with multiple, related file attachments to facilitate greater access to learning content. Content from multiple places is stored in the repository and then redistributed to LibGuides, learning management systems and shared repositories (See Figure 1).

Figure 1: Learning object creation, management and dissemination
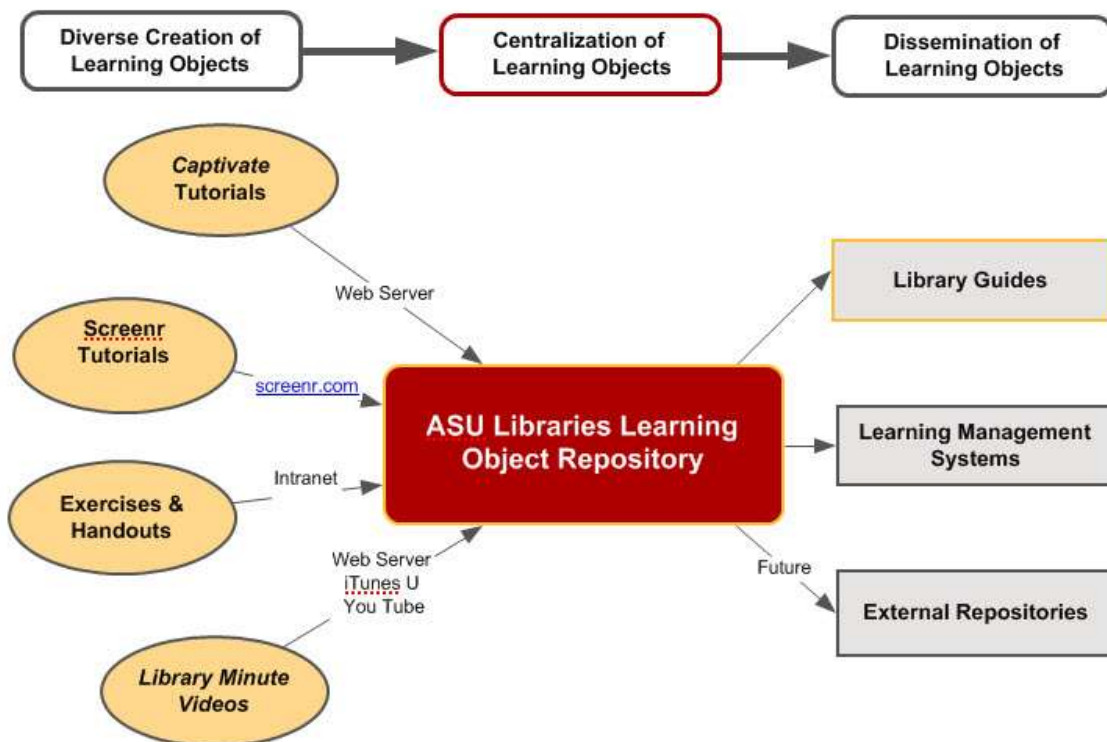
Implementation costs for the repository included technology, personnel and system installation resources. We leveraged our existing virtual machine environment to deploy Omeka with no tangible (*or additional)* technology and infrastructure costs. Personnel and time invested were minimal as compared to the resources required for the installation of the other platforms considered. The system administrator set up the hardware and software environment. The Web Librarian and Digital Library Production Manager collaborated with three subject librarians in order to address key issues for building the repository: branding, look and feel, organization and hierarchy, permissions, the digital ingest process, workflow, user interfaces, metadata schema and interoperability.

Because of the flexibility of Omeka, enhancements were quickly integrated and implemented on demand according to team specifications. For example, a decision to change from the Extended Dublin Core to the basic Dublin Core was implemented instantly. The Web Librarian was able to make this change by simply deactivating an installed plugin. The team could then review and confirm their decision without any time delay.

Because monetary, efficiency and technical barriers are reduced, librarians can publish accessible and reusable objects quickly. Omeka provides a low cost, flexible and easily implemented platform which allows for the timely and centralized dissemination of objects to faculty and students.

Conclusion

ASU Libraries initiated a flexible, adaptable and low-cost online learning presence to complement the evolving ASU learning landscape in the midst of an intense economic crisis. Iterative strategies supporting functionality and discovery enabled us to implement an internally controlled learning objects repository and launch a new approach to creating learning objects in a timely fashion. Consequently, we are not reliant on any proprietary systems for managing our learning content. Librarians now have the freedom to meet student learning needs on demand. With training in online pedagogy and instructional design, librarians are building the capacity to create quality learning content by identifying learning goals, storyboarding content, implementing simple multimedia standards and learning to use basic e-learning software. Queues and lengthy processes for generating learning content have all but disappeared. Librarians no longer have to wait for their learning content to rise to the top of an expert staff

member's list of priorities to meet student learning needs. Faculty and students have centralized and seamless access to learning objects for reuse in LMS, web pages and more. As the learning object repository is populated, the tagged items will be more accessible and can be used to support chat and e-mail services. Librarians, in collaboration with faculty and instructional designers will be able to build instructional modules from discrete learning objects in the repository. For example, a module could be created in a LibGuide with screencasted tutorials, exercises, assignments and assessments of student learning.

Academic libraries are positioned to form adaptive development environments that strike a balance between building time-consuming perfect products and creating learning objects on demand. We are in a unique position to take advantage of the increasing number of low-cost web resources that are available to help shape responsive, flexible, scalable and sustainable learning landscapes for students in the Digital Age.

Notes:

I. http://uoia.asu.edu/

II. *ASU campus growth;* http://asunews.asu.edu/20080131_campusgrowth

III. http://www.nwmissouri.edu/library/courses/research/research.htm#tutorials]

IV. http://ants.wetpaint.com/page/About+the+ANTS+Project

V. http://www.merlot.org/merlot/index.htm

VI. http://www.ala.org/apps/primo/public/search.cfm

VII. http://www.clipinfolit.org

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