Content Repositories as eLearning Tools

Community Building with Repository Services

The Academic ADL Co-Lab
With support from
The William and Flora Hewlett Foundation

Abstract

Digital learning objects are the basis for the creation of eLearning materials—and content repositories are an essential component for using and sharing digital learning objects within an eLearning community. The Academic Advanced Distributed Learning (AADL) Co-Laboratory gathers information about repository systems and provides opportunities for eLearning communities to share ideas and discuss the challenges faced by organizations involved with repository projects. Drawing from those resources, this paper looks at methods and strategies used by eLearning communities as they build repositories that prioritize interactivity, community engagement, collaboration, and social interaction.

Introduction

For organizations involved with the creation and accumulation of eLearning content, repositories are more than just tools with which to search for and retrieve digital materials. Along with the need for effective methods of storing and delivering resources, repositories are becoming online community centers for users, whether they are learners or educators. In support of such efforts, the Academic Advanced Distributed Learning (AADL) Co-Lab provides opportunities for repository project developers to learn from each other by sharing experiences and ideas. "Community building" is a common theme that has emerged from these discussions, with four fundamental requirements establishing themselves as key building blocks for successful community building in the eLearning space:

- System interactivity
- Community engagement
- User collaboration/ownership
- Social interaction.

A repository strategy based on these requirements must use a broader definition of the term "repository" than simply a collection of digital online materials and descriptive metadata about those materials. Instead, repository projects with a community building focus should provide a set of services that encourage the development and use of educational materials and also foster communication and the exchange of ideas.

The Role of Repositories in Learning Communities

There is a critical relationship between the content that is available within a repository and a user community that creates new resources for the repository. AADL summit meeting discussions [1] particularly emphasized two of the key building blocks in regard to the development of community-based repositories:

1. Community building requires constant contact with users, a reliable feedback loop, and a robust software toolset for responding to the needs of the community (Community engagement).
2. Users are more inclined to submit resources to a repository when tools and methods to aid in the creation of materials are available within the repository interface (System interactivity).

When these two development objectives are achieved, it is reasonable to expect an eLearning community to emerge that "reaches beyond the point that community members learn together and encourages the perception of being a community that learns" (Tu and Corry, p. 217).

[1] See "From Local Challenges to a Global Community: Learning Repositories and the Global Learning Repositories Summit." http://www.academiccolab.org/resources/FinalSummitReport.pdf.

As a community, the need for effective strategies for repository implementation is an important part of a shared vision of virtual communities that develop as people with a common purpose interact socially to satisfy needs. Realizing such a vision requires effective design for online collaboration in addition to an infusion of knowledge and experiences. A critical mass of users is then needed to initiate and sustain such an eLearning community, and a well-designed repository environment will "support the process of knowledge construction, increase learner satisfaction, and enable social and mutual support." (Sandrock and Kiet Vo)

Since a community is made up of individuals, it is necessary to establish policies for guiding people's interactions, and those policies must be supported and sometimes enforced by computer systems as a means to mediate social interaction. According to repository developers participating in discussions at the AADL Co-Lab Repositories Summit, the process of establishing a "community of practice" is a challenge because there is not yet a comprehensive body of collective wisdom available to guide new repository developers.

A Case Study: The Digital Library for Earth Science Education

One of the repository projects considered by the AADL Co-Lab's repository research, the Digital Library for Earth Science Education (DLESE),[2] is a community effort involving educators, students, and scientists working together to improve the quality, quantity, and efficiency of teaching and learning about the earth system at all levels. It is a project that has from its beginnings developed real-world outreach and community building techniques that have strengthened its ability to generate a collection of materials on a single subject. Launched in August of 2001 and funded by the National Science Foundation, DLESE provides educators and learners with access to thousands of resources that support earth system science education. This case study provides an overview of the DLESE project and considers how this repository project dealt with the eLearning community requirements of *system interactivity, community engagement, user collaboration,* and *social interaction.*

System interactivity

The initial services provided by DLESE in 2001 enabled educators and learners to search and browse for educational resources by grade level, keyword, and educational resource type. In 2003 the repository services expanded to allow users to locate educational resources aligned with the National Science Education Standards and the Geography for Life Standards. Also incorporated was the Community Review System, which allows users to contribute peer reviews and teaching tips about DLESE resources and incorporates multiple collections. Plans for 2005 include support for the discovery and classroom integration of spatially and temporally referenced resources, such as data, maps, and images.

The project web site also provides pointers to other sources of information, which in turn enhances the likelihood of the DLESE resources to be discovered indirectly. The web site also helps to clarify the relationship between the repository itself and the professional practice of its target community.

Community engagement

By focusing on a subject with a well-defined body of educators, practitioners, and students, DLESE has not had to create an entire body of potential users anew. Its outreach has been focused on individuals who the project's staff believes will contribute to and benefit from a robust collection of earth science educational materials.

A key DLESE strategy for community building has been an effort to discover populations already engaged in practices or delivering services that DLESE could enhance or facilitate. DLESE adopted a

[2] Visit the DLESE web site and repository at http://www.dlese.org.

phased approach in its development, creating distinct levels of outreach and services. The DLESE objective for community development involved two fundamental strategies:

- Provide resources of interest via the project's web site to the widest possible audience without diffusing the main community focus. This allows users to come to the site for a variety of reasons besides searching and looking for updates within the repository database.
- Encourage outreach to non-virtual, real-world communities to allow educators and earth science professionals to become familiar with online learning methods and the tools provided by the DLESE repository.

User collaboration

A core philosophy of DLESE is the notion of *users-as-contributors*. DLESE relies on its community to contribute educational resources and collections, to develop services that enhance the usefulness of DLESE, to participate in library governance and planning, and to contribute ideas and feedback on how to improve the library.

DLESE uses its site to make information available that would be of interest to its target audience. The site contains a "News & Opportunities" section that would appeal to professionals within earth sciences or earth science education even if their interest in discovering eLearning materials was only peripheral. This section posts items of note to the geoscience community regarding such things as grants, jobs, and workshops. In addition, the project is developing a posting tool to enable community contributions to these resources.

The project's web page also contains sections about the use of online resources in education, news from the fields of earth science and science education, and information about resources for professionals within the earth sciences. The science and education community contributes material individually or as thematic collections and includes both formally reviewed and unreviewed items.

The project's site provides users with a menu of resources that have been put at their disposal. The resources are classified by the interest group to which they appeal. These include sections such as "For Educators," providing information about pedagogy, evaluation, and assessment, as well as discussions of issues such as "Linking Research and Education."

Social interaction/facilitation

The DLESE community uses offline, non-digital and in-person outreach programs to demonstrate the project's repository system and train potential users in its use and the creation of materials. This is a good example of how an eLearning community can blend indirect, online interactions with person-to-person communication. Methods include training workshops, developer workshops, presentations at community meetings, and professional society conferences. DLESE annual meetings provide a focal point for teachers, students, researchers, and other allied groups to advance their community vision—and influence the direction of the DLESE repository as an eLearning community center. The repository web site features an "outreach activities site" that provides access to DLESE outreach materials for community use: adaptable PowerPoint presentations, grade-level handouts of DLESE resources, brochures, and posters.

Interacting with a community of professionals in these ways provides DLESE planners with valuable insights for shaping their ongoing plans. The project is able to draw upon a broad population whose collective experience provides a better assessment of the project's success than any user survey or monitoring of web-site activity.

Sustainability of the DLESE comes from their community

The experience of creating and maintaining the DLESE demonstrates that with a well-defined scope of purpose plus an active and engaged user base, a project can depend upon the community it

serves for support. The DLESE project relies on a community of interested professionals who provide feedback on successes or challenges, discuss future plans, and represent the project's interests among their colleagues and within larger communities. Because the DLESE repository project is perceived as meeting the specific needs of educators within their specific field, users in turn increase the project's success by encouraging its use and bringing others into this eLearning community.

Interactive Repositories Support Community Building

Successful repository projects like the DLESE are likely to have involved two important groups within a larger community:

- They will have created opportunities for communities of **users** to come together through discussion of issues already of importance to them and to collaborate on the improvement of the project's collections of resources.
- They will have created communities of **developers and faculty** support personnel to aid in the production of materials and the use of any authoring tools the repository project may have.

Underlying these two strategies for community building is an important reality; a project must provide the means of communication among its users and find ways to encourage interaction.

If the priority of good communication is neglected when building an eLearning repository environment, a project can be burdened by at least two mistaken assumptions. One of these assumptions is that a repository is made or broken by its search functionality, causing repository projects to be developed with too much of a focus on search and retrieval features and an expectation that users are online to seek out and retrieve one specific thing for their use. Including a collaborative focus for an online repository makes it more than a library of content deposits and enhances its roles as a research tool and as a discussion forum. As the concept of federated searching across multiple repositories becomes more and more common, the communication features of an eLearning repository will become increasingly valuable to users trying to navigate among large, integrated collections.

A second faulty assumption is that users should receive most or all of their information about a repository system and its collection solely from the resources available from the repository project itself. When users have an online presence and are able to exchange information effectively, the resulting collective information base will provide an overall resource that is greater than any of its parts. That is, the gathered information and expertise about the collection and its potential uses has the potential to exceed the limited resources of any single project on its own. Discussion participants also agreed that the means to this end are outreach programs that: one, encourage users to use the repository itself, and two, introduce users to the stated goals of the repository system, be it advocating learning object use or facilitating a specific kind of technology-enhanced education.

When a repository project allows users to exchange information, it encourages use of the materials, self-identification among users, and new participation, fostering the development of a greater body of information than the project could have gathered on its own. Ideally, repository users will become contributors and developers.

An eLearning repository requires ongoing maintenance, and the long-term success of a project depends on attracting a developer community to provide efficient maintenance. Discussions about this topic at the AADL Co-Lab Repositories Summit advanced the idea of bringing community members into the maintenance cycle as a way to ensure continuous support and to reduce the need for paid staff.

While these strategies will not eliminate costs, they are ways to enhance the viability and sustainability of a repository project—and contribute to a sense of worth that may help to secure the ongoing funding needed to support such a project. As the DLESE project demonstrates, an active user

base can draw upon its community of users for some of the services that might otherwise need to be provided by a paid staff.

User Collaboration — Community Ownership and Institutional Affiliations

While preparing for the Co-Lab Repositories Summit, AADL researchers observed an unexpected trend among the repositories they had chosen to investigate.[3] Within the United States, repository projects that are eligible to benefit from and be supported by centralized educational systems are often not closely associated with any specific educational institution. While these repository projects often had their staff and their servers on university campuses, there was often no direct evidence on their site that they were integrated into, or provided a service to, institutional structures, educators, or learners on those campuses.

While this may be part of a larger strategy to deliver context-neutral services to a community outside the bounds of any single educational institution, it may also prevent the projects from fully taking advantage of a community of users and contributors that are available and able to support the project in various ways. By comparison, projects run by library systems affiliated with a university system benefit from a support network of affiliated individuals and alliances. These groups make use of institutional structures that increase a general awareness of who they are and what they can do for learners and educators within a local community. However, an institutional identity (or "branding") might inhibit buy-in from potential content providers outside of the sponsoring institution.

A library or faculty support web site is likely to be easily accessible through the links made available on a school's web site. In contrast to this, some repositories exist in an isolated bubble of online space, not easily reachable even from the web site of the university where their project is based.[4] Co-Lab researchers also observed that some repository services are not listed among the primary web services of the campus on which the project is housed.[5]

Social Interactions That Support Repositories

Drawing upon support from the community of users for the care and nurturing of an eLearning repository system can be the key to a successful project—particularly when funding is limited. The AADL research on repositories provides numerous examples of forward-thinking repository developers who have emphasized strategies for community involvement along with the technical features of content management. Making contact and encouraging collaborative interaction among repository users have been shown to be important factors not only in maintaining the repository, but in more effectively using its contents in education.

Along with providing the means for communication among users, the quality of the interactions can be enhanced by knowing the characteristics of user-community members and being prepared to respond to their needs. More than defining users as a demographic group or class, or understanding their motivations as a group, a robust eLearning community system will build upon personal relationships through online forums, offline exchanges, and in-person meetings when possible.

Creating or drawing upon a community of users that is aware of its own interests, and sees the repository system as a service to address those interests, will permit that repository project to become

[3] Information accessed from the AADL Co-Lab Learning Repositories Database

[4] Examples of this include the Maricopa Learning Exchange, which cannot be easily reached through the home page of the Maricopa Community College System. Likewise, the Eisenhower National Clearinghouse and the Learning Matrix are both projects located on the campus of The Ohio State University but not readily accessible from that school's home page.

[5] One notable exception is MIT's Open Coursewares Project, a repository of course materials created by MIT faculty for MIT classes. This site gains much of its authority and popularity from its close association with MIT's faculty and teaching practice and is immediately available through MIT's home page.

central to establishing a community of practice that further optimizes the collection and sharing of information resources. Repository projects can and should operate outside of the virtual community and take advantage of real-world communities in order to encourage use of the content and features available within a repository system. The AADL repository research provides some valuable observations about successful repository projects and the strategies for maintaining content and responding to users' needs:

- **Draw upon a pre-existent community (educators, educators within a specific field) that has an interest in the improvement of its professional practice.** This permits the project to both address and respond to the interests of a group through direct contact with them and through the exchange of information among the community's members.
- **Provide related special interest groups with outreach capabilities.** Creating alliances and transforming communities of professional interest into communities able to share and demonstrate their ideas will expand a repository's resources and improve its effectiveness.
- **Provide instruction that introduces users to the principles informing the design of the repository system.** Educating participants in the use of a repository and its resources and about the general benefits of the instructional application of learning objects will strengthen an eLearning community. Outreach programs that help users overcome the barriers obstructing their involvement with a repository community are likely to become self-sustaining as community members support each other. As users learn more about the creation and development of learning resources, a repository project will become more successful in achieving the broader objective of transforming the educational process.
- **Maintain constant contact with users by providing tools and educational materials.** Making materials and authoring tools available to users will help transform an online content repository into a vital eLearning community. Whether or not visiting users are concerned for the survival of the repository itself, providing them with trusted content materials and useful authoring tools will enhance credibility while assisting the professional development of community members.
- **Encourage the use of standards, but avoid imposing them in such a way that they become barriers.** Adopting standards for the development of learning objects and for the functionality of repository technology is important, but measures that are too strict can discourage potential eLearning community participants. Rather than allow a community to narrowly serve a small group of individuals who are equipped to use the continually evolving technology of information management, an eLearning community will attract more participants by developing user-friendly authoring tools and making support available to encourage the understanding and use of standards. An eLearning community that makes the authoring of materials easier for users while also creating reusable learning objects (such as SCORM packaging and metadata) will be helping its community members gain technical expertise while also helping to build a more robust repository system.

Conclusion

Changes in practice and behavior are rarely achieved through technologies alone. The everyday practices of real people are socially and institutionally embedded, and while technologies can nudge their behavior in one way or the other, people's behaviors can be best influenced by locating and shaping them within those social and institutional contexts.

A repository project will engage in many tasks, such as outreach and education that the project's organizers may see as outside of the core domain of the repository project itself. Yet the task of a repository project is not, ultimately, only to deliver a set of technical functionalities to users. Repositories are developed in the hope that a culture of practice will arise around them to improve learning, pedagogy, and communication within and across communities. It should come as no surprise that the creation of

such communities comes not solely from making technologies available, but also from modeling that community of practice through activity both on- and offline.

The policies and strategies of the projects reviewed by the AADL Co-Lab strongly suggest that a major key to successful eLearning repository development is the involvement of the community of users themselves. For successful repositories, the development of interest is not left to a web site alone, but rather interest is developed by addressing users directly and providing the means for interaction among them. Once such a sense of community is established, a repository project can further expand its role as a community builder by providing a robust range of materials, services, and information for users to draw upon for their own use and benefit. Combining these features with a well-crafted digital collection of learning objects that can be efficiently searched will allow a repository project to expand beyond the primary role of an archive that collects information used in searches.

For repository builders hoping to build eLearning communities, an attitude of "if we build it, they will come" is not sufficient. Community-oriented repository projects of the future must continuously address technical issues along with community building concepts—and that means striking a good balance between being a storehouse of searchable knowledge and enabling communication and interaction among a community of individuals.

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