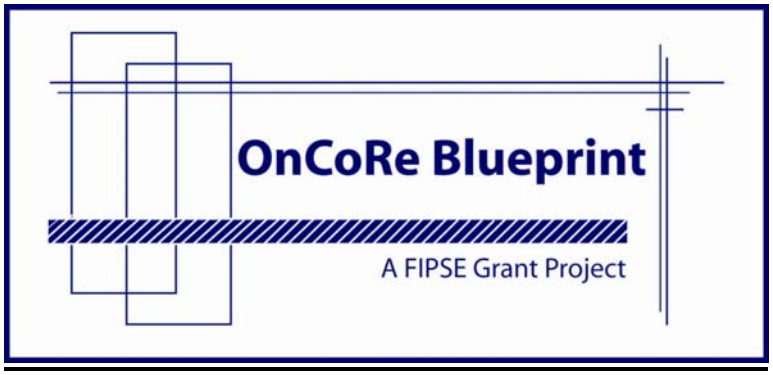
The Online Content Repository Blueprint



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INTRODUCTION

The Online Content Repository (OnCoRe) Blueprint Project presents a sustainable national model for the creation of statewide digital repositories. Supported by a grant from the Fund for the Improvement of Postsecondary Education (FIPSE), the OnCoRe Blueprint Project provides state and other initiatives with a “how to” manual, resources, and research background for developing a standards-based educational repository.

FIPSE website: http://www2.ed.gov/FIPSE

Value of the Blueprint

In 2002, Susie Henderson began to conceptualize and envision a distance learning repository for Florida. At the International Repository Summit in Madison, Wisconsin, that same year, during a panel discussion, she asked the group, “Is there a how-to manual or cookbook for developing a repository?” The question surprised the audience. Although most of the repository professionals present recognized the potential value of it, they admitted no such guide existed. This OnCoRe Blueprint project—created by the same staff that developed The Orange Grove Repository—aimed to fill that void. Established in 2004, The Orange Grove is a K-20 repository designed to collect and store learning resources for use by Florida teachers and educational institutions. Both The Orange Grove and the Blueprint are initiatives of the Florida Distance Learning Consortium (FDLC).

Determined that Florida’s repository be built on a firm foundation, the planners of The Orange Grove began with a thorough research of standards—both technical and metadata—and well thought out policies from other repositories that might be adapted to its own initiative. In doing so, Florida has become a leader in careful planning and the use of a standards-based approach that ensures interoperability of content among repositories.

Statewide repository initiatives in California, Georgia, North Carolina, Kentucky and Louisiana are moving forward in various stages of development. Ideally, with Florida, these efforts will produce a system of repositories that can share content, improve teaching and learning, and reduce costs. The Orange Grove has received and continues to receive requests for guidance from a variety of organizations and institutions launching repository initiatives. The OnCoRe Blueprint Project is a response to this demonstrated interest and need. Our Blueprint builds on the expertise developed in Florida as well as other states.

The OnCoRe Blueprint records the methods and lessons learned during the design, implementation, and ongoing support of The Orange Grove. It also reflects collected wisdom garnered from our research, interviews, and discussions with pioneers, planners, and implementers of repository projects. The OnCoRe project staff thanks these groups for so freely sharing their past and current processes, methods, and ideas for improvement through the Blueprint. For a complete list of these individuals, see Appendix 14.

The Blueprint presents examples of decisions made in specific situations during the planning or implementation of a statewide online repository. Developers of new repositories can learn from the experiences of professionals who have forged the way. These examples illustrate both the things that were done well and the things that could be improved upon. The Blueprint’s goal is to provide a practical guide for those developing and establishing a statewide or institution-wide repository project.

In addition to this guidebook, the OnCoRe project maintains a project website, a webinars series, and a project Wiki. As members of our community share experiences as our repositories grow and develop, the Blueprint will become more valuable and robust. Through ongoing communication, your group will find a supportive community of practice, experience a more efficient implementation of your repository, and be able to share your own state’s perspectives and insights.

The OnCoRe Blueprint Project

The OnCoRe (Online Content Repository) Blueprint is a “how-to” manual for groups who are developing a statewide, educational repository. Repositories house and manage digital resources, facilitate the discovery of existing resources, and enable their sharing and reuse. Because such repositories are often quite large—encompassing statewide, regional, or national systems, multiple levels of appearance, accessibility, and control mechanisms are important issues.

The most commonly cited reason for creating a repository is to efficiently and economically share information and resources. Often groups within a state suffer from a "silo effect" by functioning independently—frequently on similar projects—without knowledge of each others’ work. Each group generates learning materials and stores them in its own "silo" making them available only to its members and possibly a few others. Such a system of allows no communication among communities and institutions working on similar projects, creates barriers to collaboration, and duplicates efforts. Unfortunately, most states' digital collections are typically silo structures. . Repositories, on the other hand, centrally store digital products from a variety of institutions, organizations, and disciplines and make them available statewide. The repository then is a searchable "warehouse" for users to research, locate, and use or adapt its resources to meet their instructional or institutional needs.

Consider the following example of "silo vs. warehouse" approach. A university professor creates a computer animation illustrating a specific concept in mathematics. If the animation remains stored on the professor’s computer and is used only in his courses, its potential benefit to the education community remains unrealized. Meanwhile a community college math instructor looking for material on that same math concept for her class devotes time and energy to searching the Web for content or creating her own similar visual. Thus we have two silos storing valuable educational resources. If a statewide repository were available to all educational institutions, the university professor could make his animation not only accessible to the community college instructor, but to anyone else teaching the same concept. The community college instructor could easily locate the resource and use it as-is or adapt it to meet her particular needs. If she adapts the resource, she also can place her adaptation in the same repository to share with others. Such a centralized “warehouse,” eliminates duplications of effort and allows instructors to use their time and energies more efficiently.

With such a repository, an unlimited number of educators share quality, reusable learning materials, enabling students at multiple levels to understand a specific concept. A lesson on algebraic equations could be used in an advanced middle school or high school algebra class, a community college nursing course, an evening GED class, or even in an entry-level business course. Digital learning resources allow instructors to use a variety of visual, auditory, or tactical/kinesthetic teaching strategies to present and explain difficult concepts—of great assistance to students who do not all learn the same way.

Our Blueprint facilitates resource sharing by helping others create educational repositories that serve all the stakeholders in a state's higher education system. The three major sections of the Blueprint are arranged chronologically as follows to reflect the progression of the creation of a repository:

- Planning
- Implementation
- Sustainability

Each section contains recommended steps for that phase of development and the expected results, as well as links to any relevant resources. Also each section presents actual experiences from The Orange Grove and other repository projects that illustrate how ideas discussed in the Blueprint were applied.

As your group will discover in examining the Blueprint, different repositories have taken a variety of pathways to implementation. Each project's context, resources, and goals are different. We, therefore, urge your group to carefully examine each recommended component and consider its value to your state's project. We also invite you to share any insights that you may gain during your project, including

additional steps, resources, or case examples. This will ensure that the Blueprint continues to reflect the changing repository landscape and to be an ongoing, useful guide.

PHASE 1: PLANNING

General Knowledge Exploration

Before embarking on such a large scale project, your group should gather as much information as possible to provide a solid foundation. The most basic step is a fundamental understanding of repositories, their purposes and common vocabularies, and the benefits a repository might bring your state. Studying the common features of a repository, and what each set of features allows you to do, will be invaluable.

To facilitate this process, we have included a glossary of terms and definitions (see Appendix 15). It provides useful vocabulary for the research, development, and implementation of a repository project. Also included in this section are some suggested sources for preliminary background research that discuss various aspects of online content repositories. Many other excellent sources are available. We suggest reading as widely as possible about digital content development standards, consortia, and tools that help you scan for emerging opportunities as well as keep you abreast of the latest developments in the field.

Results of this Step:

- Familiarity with current repositories
- Familiarity with repository types, features, and options
- Background information to establish the need for a repository
- Knowledge of repository vocabulary

Suggested Resources

The following list of resources is by no means exhaustive, but it is a good place to begin.

- ***Design and Evaluation***, Pamela T. Northrup, editor. This book shows how practical models of learning objects solutions are being applied in education, organizations, industry, and the military. It includes diverse strategies used across these groups to apply learning objects—from the use of firmly-grounded theoretical contexts to practical tool-based solutions. The reader will find a thorough history, solid models, and real-world practices for using learning objects for instruction in a variety of settings. (ISBN 978-1599043340)

- ***Metadata Fundamentals for All Librarians*****,** Priscilla Caplan. Geared to librarians who need a solid foundation for understanding and using metadata efficiently, *Metadata Fundamentals for All Librarians* is the first stop for public and academic librarians, catalogers, and digital and reference librarians in their journey through the metadata landscape. Priscilla Caplan, one of the nation's leading systems experts, presents the most comprehensive and clearest descriptions of the various forms of metadata, its applications, and how librarians can put it to work. (ISBN 978-0838908471)

- ***Advanced Distributed Learning.*** The Advanced Distributed Learning (ADL) Initiative was formed as a developer and implementer of learning technologies across the Department of Defense (DoD). ADL employs a structured, adaptive, collaborative effort between the public and private sectors to develop the standards, tools, and learning content for the learning environment of the future. The vision of the ADL Initiative is to provide access to the highest-quality learning and performance aids that can be tailored to individual needs and delivered cost-effectively, anytime and anywhere. http://www.adlnet.gov/

- ***Academic ADL Co-Lab.*** The Academic Advanced Distributed Learning (ADL) Co-Lab serves as the focal point for academia in promoting high quality, reusable content for distributed learning. This Co-Lab is the ADL academic link to test, evaluate, and demonstrate ADL-compliant tools and technologies to enhance teaching and learning. http://www.academiccolab.org/

- ***Reusability.org.*** This site offers insight into ways to increase access of learners to educational content and opportunities. It offers the full text of the book, *The Instructional Use of Learning Objects,* edited by David Wiley. Website users may also participate in discussions of issues related to learning objects, instruction, and learning. http://reusability.org/

- ***Reusable Learning.*** The website of the Reusable Learning Project, focusing on digital learning resources including web-based content, digital documents, applets and software, simulations, data sets, interactive learning environments, and multimedia resources. The project's goal is to increase the value and impact of digital learning resources by making them easier to reuse, or to modify for reuse, in multiple contexts and in multiple learning environments. http://reusablelearning.org/

- ***The SREB Educational Technology Cooperative.*** This multistate cooperative represents more than 3,300 school districts and nearly 800 colleges and universities in the 16 Southeastern Regional Education Board states. It monitors and reports on a wide array of educational technology topics and includes the State Virtual Schools, Digital Learning Content, and SCORE (Sharable Content Object Repositories for Education) initiatives. www.sreb.org/educationaltechnology

- **OnCoRe Blueprint Wiki.** The OnCoRe Blueprint wiki offers a forum for ongoing discussion repository issues and provides a community of practice for repository developers. http://www.oncoreblueprint.org

Suggested Repositories

Visits to existing repositories to review their policies and procedures can be very informative. The following list is only a sampling of active repositories; for a more extensive list, **click here**.

- **Connexions** (http://cnx.org/) Connexions is a nonprofit start-up launched at Rice University in 1999. It is a self-described attempt to "reinvent how we write, edit, publish, and use textbooks and other learning materials and provide an environment for collaboratively developing, freely sharing, and rapidly publishing scholarly content on the Web."

- **LoLa Exchange** (http://www.lolaexchange.org/) LoLa (Learning Objects, Learning Activities) is an exchange for facilitating the sharing of high-quality learning objects. Housed at Wesleyan University, it contains materials for use across the curriculum with a particular focus on modules for Information Literacy.

- **MERLOT** (http://www.merlot.org) MERLOT (Multimedia Educational Resource for Learning and Online Teaching) describes itself as "a leading edge, user-centered, searchable collection of peer reviewed, higher education, online learning materials created by registered members, and a set of faculty development support services. MERLOT's vision is to be a premiere online community where faculty, staff, and students from around the world share their learning materials and pedagogy."

- **WISC online** (http://www.wisc-online.com/) The Wisconsin Online Resource Center is a digital library of learning objects. These resources are accessible to all Wisconsin Technical College System (WTCS) faculty at no cost and with copyright clearance for use in any WTCS classroom or online application. Other colleges, universities, and consortia from throughout the United States and around the world use the library with permission. Current use of the learning object repository exceeds 20,000 hits per day.

- **OER Commons** (http://oercommons.org/matters) **Open Educational Resources (OER) Commons** is a teaching and learning network of shared materials from K-12 through college covering a variety of subject areas. OER is open to everyone features lesson plans, lectures, labs, and syllabi that are open to adapt for your own use.

- **Digital Marketplace** (http://www.calstate.edu/ats/digital_marketplace/) The goal of the Digital Marketplace (DMP) initiative is to enable the effective distribution of network-based digital goods and resources in support of CSU academic programs.

- **Intute** (http://www.intute.ac.uk) Intute is a free online service providing access to Web resources for education and research. The service was created by a network of UK universities and partners. Subject specialists select and evaluate the websites in the database and write high quality descriptions of the resources. The database contains over 100,000 records.

For a list of additional repositories, Visit the OnCoRe Blueprint website:
http://www.oncoreblueprint.org/resources/repository_information.html

Other Research Areas

According to research, digital learning repositories differ according to intended purpose. Some functional purposes include

- hosting instructional content for access by teachers, librarians, students, and parents,
- fostering collaboration among instructors and instructional developers to create instructional resources, and/or
- serving as a research archive, publication vehicle, and/or collaboration vehicle for research faculty.

Some repositories host instructional content as large and diverse as a public or university library collection; others have more focused content as in a law library or a special collections library. Your repository's design should meet the needs of all stakeholders, contributors, and users and their different areas of interest. In conceptualizing the uses or purposes of your repository, your development team must consider the specific context for your state.

Although the design may be adapted or expanded to include other functions, the focus of this blueprint is the development of a statewide, educational repository for use by postsecondary educators.

Before you begin the phase, *Solicit Statewide Leadership Support*, conduct a needs assessment. This important research tool helps you identify statewide "market" conditions that support or pose challenges to development, and identify target audiences and how their needs can be met by a repository. This information will be useful in soliciting statewide support and later in *Strategic Planning*.

As you conduct the needs assessment, try to include a representative sample of potential users. Gather your data via surveys, interviews, or focus groups. Useful documents for a market scan include state and institutional budgets and strategic planning reports, especially from libraries and from chief information officers (CIOs).

Your team should also explore the how much a repository might benefit your state. As you have seen, repositories facilitate information sharing and prevent duplications of effort. Your team may want to assess how much duplication of effort and sharing is currently happening in your state.

During their planning phase, North Carolina's team of developers analyzed the financial benefit a repository could provide its state. Using $25/hour as an estimate of the time costs, they configured the amount of instructor, administrator, and technical support time a centralized repository could save the state. They also factored in the cost of not establishing a statewide repository and of faculty continuing to duplicate resources and to build a system of information silos. They were able to demonstrate that a repository could save approximately 2000 instructors 10 hours of time and effort per semester—resulting in a savings of millions of state dollars.

Specific problems that could be solved by the creation of a repository are invaluable information for your development team. They not only help in the operational planning, but are also useful in seeking support from various constituencies within your state.

Solicit Statewide Leadership Support

Once you have a knowledge framework, your team needs to inform your state's leaders of the value of a repository. In order to launch any initiative, support for the project from highly placed leaders who can assist with securing funding, getting buy-in from key state entities, and allocating resources to the project is of ultimate importance.

Based on our experiences, The Orange Grove creators believe that our project would have grown more quickly and faced fewer hurdles had statewide leadership been involved earlier in the project. Broad support from statewide leadership helps obtain funding, provide project staff and resources, encourage institutional use of the repository, and in myriad other ways.

To begin, identify the potential leaders in your state who will participate in high-level planning and continue to champion the repository project as it progresses. Listed below are potential leadership contacts:

- State educational leadership (state department of education)
- University leadership (boards of governors or regents, university presidents, or consortia)
- Community college leadership (governing bodies, college presidents, or consortia)
- K-12 leadership (special projects teams, technical interventions groups, governing or standards bodies)
- State or university library communities
- Statewide library or information studies programs (deans, chairs, academic instructors)
- Individuals with previous experience in planning and implementing large-scale or statewide repositories or similar initiatives (department of education staff or leadership, state consortia members, private consultants)
- Individuals with knowledge of information systems or large scale computer networks for statewide initiatives (instructional technology (IT), administrators for universities/community) colleges/governmental departments)
- Statewide consortia and existing institutions whose missions support technology-delivered learning
- Legislators and legislative staff that deal with educational issues

Also, consider seeking the support of existing institutions to advocate and facilitate the creation of your statewide repository. In Florida, the Florida Distance Learning Consortium (FDLC) which facilitates cross-institutional communication and has successfully spearheaded statewide initiatives in distance and technology-based learning was a natural vehicle to help establishing a statewide digital repository. The Consortium's goal is the improvement of student learning and access to education, while recognizing the autonomy of Florida's educational institutions.

In Georgia the repository project aligned with Advanced Learning Technologies, the statewide office charged with helping Georgia institutions use technology for instruction. Advanced Learning Technologies took content from courses they had already created and redesigned it into learning objects to be housed in their repository. Individuals from such organizations may be helpful in the planning process and serve as useful contacts for later phases of the project.

All the leaders of repository projects interviewed for this Blueprint emphasized that identifying partner organizations and gathering support was vital to moving the project forward and enabling subsequent progress. As The Orange Grove developed, Susie Henderson, working through the FDLC, made presentations and discussed the project with various leaders. Over time, she solidified support for the project, and, in 2004, the FDLC named The Orange Grove its top strategic priority.

In North Carolina, Bill Randall used his personal network to get things started. He made phone calls, sent emails, met with people, and made many presentations to garner support for the project. He solicited key support from the North Carolina Community College E-learning Commission, informing them of the benefits a repository would offer to the state and to the education system.

Results of This Step:

- Support of statewide educational leadership for the repository project
- Establishment of an ad hoc Project Leadership Group to create high-level plans for repository
- Overall view of the planned direction of the repository
- Recommendations for Strategic Planning Partners

Websites:
Florida Distance Learning Consortium (FDLC): http://www.fldlc.org/
Advanced Learning Technologies, University System of Georgia: http://alt.usg.edu/
North Carolina Community College E-learning Commission: http://www.elearningnc.gov/

Educate & Inform Leadership.

Once you have identified your potential state leaders, you must educate them about the project. Create talking points and presentations to prepare your project group and others to seek support for your repository with influential persons. Effective talking points that help staff focus arguments and present a unified vision. PowerPoint presentations can clearly illustrate the repository concept and demonstrate potential benefits to your state. Sharing a standard PowerPoint presentation with project advocates also helps to unify your message. Graphics are particularly effective in presenting concepts quickly to people who are often short of time or attention. Below are some samples of resources that we used in soliciting support for The Orange Grove.

Resources:

- **Orange Grove Talking Points** (bulleted version)
  http://www.oncoreblueprint.org/_doc/OGDocs/TalkingPtsBrief%20.pdf

- **Orange Grove Talking Points** (narrative version)
  http://www.oncoreblueprint.org/_doc/OGDocs/TalkingPtsLong.pdf

- **Teaching and Learning with Digital Resources** (Orange Grove PowerPoint Presentation)
  http://www.oncoreblueprint.org/_doc/OGDocs/TeachLearnWDigRe.ppt

- **Orange Grove Structural Diagram**
  http://www.oncoreblueprint.org/_doc/OGDocs/OGStructure.pdf

- **Orange Grove "How Users Locate Digital Content" Diagram**
  http://www.oncoreblueprint.org/_doc/OGDocs/DigitalContent.pdf

- **Orange Grove Benefits Realization Table**
  http://www.oncoreblueprint.org/_doc/OGDocs/BenefitsRealizatonTable.pdf

Recruit Leadership Group Members.

Once you have secured their preliminary “buy in,” request that your state leaders suggest participants for an initial high-level planning group. We refer to this group as the Project Leadership Group. This ad hoc group will help you identify the appropriate purposes and goals for the development of your state’s repository and provide guidance during its initial phases. Members may also serve as important dissemination partners or contacts later in the project, but generally they will be engaged only in preliminary planning and developing the “big picture” of the repository, rather than the later, more detailed planning. This group will recommend people or assign staff to do the detailed strategic planning for the initial implementation and beyond. Select a point person or a project manager from your team to oversee the activities of the Project Leadership Group.

Appointing members to the Project Leadership Group who will take a systems approach to the project helps create the overall vision and generate commitment from their various constituencies. Even though the makeup of the leadership group will vary, you should identify individuals in influential or senior positions within your state education system. Enlist people with skills useful to the project, such as those with experience in implementing large scale projects, with library or information studies backgrounds, or with experience in the use of metadata in repositories.

Invest considerable effort in recruiting members of the Project Leadership Group. It will help prospective collaborators see the potential value of the project to their areas of expertise and leadership. Here again, effective PowerPoint presentations or other visual aids are essential tools to communicate and illustrate your points. Creating an influential Leadership Group, representing high-level state education leaders committed to the progress of your repository project progresses is a vital step.

Convene Project Leadership Meeting.

Once the Project Leadership Group members are recruited, convene a meeting to begin charting the project's course. This group will probably meet only once. A face-to-face meeting is preferable. If necessary, meeting by conference call or via web conferencing are also options, but are probably better venues for follow-up discussions rather than for the initial group meeting. The goal of the initial meeting is to discuss overarching project issues: the purpose of the repository, who should be involved in its planning and implementation, and preliminary ideas about how the start-up and sustainability of the repository will be funded.

The Project Leadership Group should also address some fundamental questions about and reasons for a statewide repository. Some issues to tackle are as follows:

- What statewide problems might this project help to solve?
- What are the potential benefits (positive results) of this project for your state? This may include cost savings, improvements in teaching and learning, or other positive outcomes.
- What new opportunities can the project create for your state?
- What expected or emerging opportunities can this project capitalize on? Use your research and background reading to highlight any promising trends or developments in the repository field that may be of benefit to your stakeholders.
- What funding strategies are appropriate? Consider two funding pathways. First, if sufficient funding is available, you may want to implement a pilot or small scale repository. The information and data obtained from this small implementation can be used as a case study to justify future funding. The second option is to use your initial research to justify and request funding to initiate the large-scale project.

A worksheet of possible questions for the Project Leadership meeting has been provided.

Also use this group to recommend people to serve as the project's Strategic Planning Partners, who will further define the project. Some of the Project Leadership team members may be willing to serve themselves. If not, have them recruit or designate a staff member from their organization or institution to participate on their behalf.

Resources:
Leadership Meeting Worksheet (See Appendix 1)

Strategic Planning

Planning is by far the most important part of setting up an online content repository. Detailed planning at the beginning of the project allows the group to set realistic goals and determine the best course of action for achieving those goals.

Some of the key decisions to be made are

- What is the mission of the project?
- Who will your repository users be?
- How many users will your repository support?
- What types of content will be accepted and from where will it come?
- Will the digital objects be physically housed in the repository or will there be links to items stored on other servers?
- Who will be authorized to submit items to the repository?

You should address these questions and many others during the planning process. While the task may seem a bit daunting at first, careful planning will make it manageable.

Results of this Step:

- Strategic Planning Partners enlisted
- A clearly articulated statement of values and vision for the project
- A project mission statement
- A well defined list of project stakeholders
- Types of services your repository will offer determined
- The type of content your repository will house, where that content will come from, and how it will be added to your repository determined
- A strategic plan with goals and objectives clearly defined
- Short- and long-term priorities for the project

Verify Strategic Planning Partners

The recommendations from your Leadership Group meeting should give you a strong start toward recruiting your Strategic Planning Partners. Next you should contact each of these people individually, especially if they are not known to you. You still need to sell your concept and convey your enthusiasm for their collaboration. If you do not know much about potential partners' backgrounds, ask them to share a resume or curriculum vitae with you.

Examine the makeup of the team to see if you have representation from three key groups:

1. People who will help to develop, administer, or implement the project (project staff)
2. People who will directly use the repository's services (faculty, librarians, administrators, e-content developers)
3. People at the leadership level, above those who will be directly served by your repository (provosts, VPs, institutional administrators, state education staff)

To gain early support from potential users and others impacted by your repository, start with as diverse a membership as possible, but keep the group a manageable size. Too large a strategic planning team can make the process cumbersome; discussions can become scattered and unproductive. With too small a team you may miss valuable perspectives. An ideal strategic planning team should be about 10-15 people.

When Georgia's development team established a project advisory committee, project leaders selected only those people who had demonstrated an interest or who had contacted the project's leadership about using a statewide repository. One member was an institutional administrator for WebCT Vista, Georgia's statewide learning management system whose job was to help faculty find content and build courses. She had held workshops on working with their prototype Vista repository and was a logical choice for the new repository development team. Other members selected were those who had interest in the area, were knowledgeable about course development, had experience with distance learning, or who were known supporters of the project. About 15 people are currently on their advisory committee.

Schedule Strategic Planning Session

Once a Strategic Planning Partners team is selected, schedule a two-day meeting to establish the goals, objectives, and priorities of the repository project. Your strategic planning partners will work together to

- define the purpose of your repository project
- define strategic goals and objectives
- plan and record how you will evaluate your efforts so that you can improve upon your subsequent efforts.

You may also want to hire a facilitator to conduct your strategic planning session. When the meeting is moderated by someone not participating in the planning itself, the team members can concentrate solely on their deliberations and output. The facilitator maintains the structure of the meeting and keeps things running smoothly. With or without an external facilitator, decide before the meeting how you will capture input from participants, process the input as a team, and make decisions to move forward.

Conduct Strategic Planning Session

Although it is tempting to start working on details immediately, take time at the outset of the meeting to clearly define your stakeholders, vision, mission, and goals. These decisions serve as an ongoing reference point as you move forward. The team should also consider how and when you will measure the effectiveness of your efforts, in order to continually improve your methods as you pursue your goals. If your team doesn't complete all the strategic planning tasks during this meeting, have them agree on follow-up steps at the meeting's conclusion.

The following areas should be addressed by the Strategic Planning Partners:

1. Verify and Finalize Stakeholders
2. Review Strategic Questions
3. Define Project Values
4. Create Vision Statement
5. Create Mission Statement
6. Brainstorm Possibilities and Assess Resources
7. Determine Strategic Goals
8. Establish Short- and Long-term Priorities and Outcome Measures
9. Assign responsibilities for Operational Decisions

Verify & Finalize Stakeholders

A stakeholder is anyone who will be impacted by the repository project. Typically your stakeholders will come from a variety of areas or institutions. During the formation of the Project Leadership Group, you probably identified potential stakeholders. Review those identified with your team and add or revise the list. Establishing who the project stakeholders are ensures that the needs of these various groups will be met throughout the project.

Possible stakeholders may include

- The citizens of your state
- State departments of education
- State educational institutions
    - Public and private
    - Higher education
    - PreK-12
    - Vocational
- State agencies
- Faculty and teachers
- Parents
- Students
- Other state collections and libraries
- Other repositories
- Libraries at the state, county, local level
- Institutional libraries for
    - Public and private
    - Higher education
    - PreK-12
    - Vocational
- Your organization (sponsoring this project)
- Publishers of educational content
    - Digital publishers
    - Hard copy publishers

Review Strategic Questions

Once the list of project stakeholders is finalized, the team will meet to further define the directions established by the Project Leadership Group.

Begin by reviewing the high level directions created by the Project Leadership Group (see Project Leadership Group Worksheet, Appendix 1). This “big picture” of the project will help the Strategic Planning Partners establish the detailed objectives, define the project’s potential opportunities and benefits for your state, and identify problems solved by the creation of the repository. The team’s job is to expand on the ideas in the big picture or suggest adjustments, but to always remain aligned with the direction given by the Project Leadership Group.

Define Project Values

A useful next step is to articulate the values that underlie your project. Have the group define these ideals and principles in statements or simply in single words. This process helps focus the basic philosophy of the project and its partners, offering a natural transition toward creating a project vision statement. The value statements or words are also useful in later marketing efforts.

Using brainstorming techniques, gather unedited input from the team members to capture the values. Members may then work together to combine any statements or words that refer to the same concepts. The team should also roughly define each term used, to be edited and reviewed at a later time.

When The Orange Grove strategic planning team began this process, they thought of value words that should apply to the repository. During brainstorming, they used three words often—"trust," "quality," and "reusability." After all the suggested words were listed, the team voted on which words they thought were the most appropriate values for the repository.

After much discussion, study, and research, The Orange Grove initially settled on the following list of values:

1. **Quality** – Content is accurate, grammatically correct, and conformant to technical and metadata standards. Lessons are instructionally sound, support measurable learning outcomes, and are based on Southern Regional Education Board and Learning Object Review Instrument (*Principles of Effective Learning Objects*, March, 2005), with ongoing evaluation of effectiveness.
2. **Trust** – The repository provides accurate, persistent, and reliable content and systems.
3. **Productivity** – Whenever possible, the repository community makes effective use of existing digital resources to increase productivity, cost efficiency, and reduce development time.
4. **Sharing** – The repository community contributes to the resource collection and uses or re-purposes resources created by others.
5. **Partnerships** – The repository community supports collaboration and federation with other repositories, resource collections, and publishers.
6. **Continuous improvement** – The repository improves through systemic evaluation and application of its findings.

Create Vision Statement

A vision statement is a compelling description of what the project could one day become. It goes beyond the project's current parameters and goals and describes an idealized version of what your repository could be in an ideal world. When creating your vision statement, dream big. Do not worry about whether or not you can reach your idealized repository in the first 5 or even 10 years. Knowing all you know about current and emerging opportunities and reflecting your values, imagine the best possible version of your repository doing everything you could ever hope it would do.

Your vision statement often describes how your project will contribute to the improvement of the system in which it will function. The vision should be something that resonates with the members of the team and makes them excited to be a part of it.

Here are some examples of the vision statements of various repositories:

- **Exploratories** (http://www.cs.brown.edu/exploratories/about/home.html) "The next-generation of learning technologies, manifested as full courses and digital libraries of richly interactive educational software components ("learning objects") and curriculum units, will transform traditional teaching as well as powerful Web-based offerings. Just as film began by mimicking theater, today's Web-based courses imitate our traditional course models. In our vision, a vocabulary for this new medium, developed through parallel, mutually stimulating development of medium and content, will underlie the realization of this new genre's full impact."

- **GEM (**http://www.thegateway.org/about/gemingeneral/about-gem/) "GEM will be the world's leading metadata cooperative, helping educators serve students by providing access to educational knowledge through cutting edge innovation and collaboration."

- **MERLOT** (http://taste.merlot.org/) "To be a premiere online community where faculty, staff, and students from around the world share their learning materials and pedagogy."

Create Mission Statement

With any project, it is important to articulate the mission of the enterprise from the very beginning. A mission statement is a precise description of the project's purpose and expected results. It should lay out the reasons for the project's existence and what is to be achieved.

In creating your mission statement, ask some basic questions about the project. Why set up a repository in the first place? What needs are being addressed and how will the repository meet those needs? The mission statement should be in alignment with the values and vision you have set out in the previous steps.

Here are some examples of the mission statements of various repositories from around the world:

- **The Orange Grove** (http://www.theorangegrove.org) "To enhance teaching and learning throughout the State of Florida, The Orange Grove will provide all educators with a single point of access to easily search, locate, use, and share high quality instructional resources for every subject area."

- **CANARIE** (http://www.canarie.ca/about/about.html) (Canada's advanced network development organization) "[To] Accelerate Canada's advanced network development and use by facilitating the widespread adoption of faster, more efficient networks and by enabling the next generation of advanced products, applications and services to run on them."

- **Connexions** (http://cnx.org/aboutus/) "Connexions is an environment for collaboratively developing, freely sharing, and rapidly publishing scholarly content on the Web."

- **Exploratories** (http://www.cs.brown.edu/exploratories/about/home.html "To create a set of exemplary Web-based learning objects that teach concepts in introductory computer graphics and to document our experiences of creating useful learning objects in a Design Strategy handbook. "

- **GEM** (http://www.thegateway.org/about/gemingeneral/about-gem/) "The Gateway to Educational Materials SM (GEM) expands educators' capability to access Internet-based lesson plans, instructional units, and other educational materials in all forms and formats. GEM's goal is to improve the organization and accessibility of the substantial collections of materials that are already available on various federal, state, university, non-profit, and commercial Internet sites."

Brainstorm Possibilities & Assess Resources

Once your vision and mission statements are crafted, your team can begin to plan the features and services of your repository. Here are some areas that should be addressed:

- **Services.** What services will be offered? List services that an ideal repository would offer based on the communities to be served. Because you have ensured that the stakeholders are represented on the strategic planning team, members can provide insights into the special needs and priorities of their specific communities.

- **Content.** What type of content will your repository house? Where will the content come from? Will you be creating content for your repository or simply collecting content from existing sources? A hybrid approach is common with some content created in-house to meet specific needs or fill in gaps.

- **Funding.** What are potential sources of funding? What funding is already secured? Funding for both the start-up and maintenance of the repository is necessary. The Strategic Planning Partners may want to suggest additions to any funding sources suggested by the Project Leadership Group (e.g., legislative, grants, institutional funds). We recommend that the partners consider several funding pathways. If sufficient funding is available, the project might begin with a pilot or small scale repository instance. The information and data obtained from this small implementation can be used as a case study to justify future funding. Another option is to justify and request funding to initiate the large-scale project. The team should also decide whether repository use will be free or if fees will be charged for all or some users or services.

- **Resources.** What existing resources are already devoted to or could be used for the project (people, potential hosting facilities, hardware, equipment, bandwidth, software)?

Be sure to review any features and services in light of stated values and vision and mission statements. A worksheet of strategic planning questions has been provided.

Resources:

Strategic Planning Worksheet (Appendix 2)

Determine Strategic Goals

In previous steps, your team developed vision and mission statements and answered more detailed questions about your repository. In this step, the team will transform this information into project goals and objectives. Begin the process, by creating one or more goals for each of the areas listed above: *services and communities*, *content*, *funding*, and *resources*.

To work efficiently, divide the planning team into smaller groups to re-draft your brainstorming decisions as goals and objectives to be reviewed by the whole team. Each strategic goal should state what the project is trying to achieve with that particular service or feature and the methods to be used to achieve it. Goals should be specific, measurable, and realistic. Each goal should be broken down into objectives—specific results to be accomplished to reach the stated goal. This process is not usually straightforward or linear: sometimes several project objectives can be combined to create a broader goal. At a later stage of the project, responsibilities and timelines will be assigned to each objective to ensure that the project moves forward. The partners should review the goal statements and objectives to ensure they are in line with your stated values, vision, and mission statements.

Establish Short & Long Term Priorities

Once the team has established strategic goals for your project, prioritize them and estimate general time frames for their completion. If you are implementing your repository in stages, you may elect to focus on some content areas or services initially and then broaden your efforts over time. Be sure to consider the availability of staff and resources when estimating the time frames. This information will be used to put together a project schedule.

Consider how your project team will know when an objective or goal has been reached. Review the goals and objectives and determine the criteria that must be met for that goal to have been accomplished.

Assign Responsibilities for Operational Planning Decisions

The final task for the Strategic Planning Partners is to assign responsibilities for researching and completing the next steps of the project. We call this phase of the project, *Operational Planning*, and suggest a team structure to research, recommend, or create the policies, guidelines, and processes, and the technical, budgetary, and administrative structures needed to implement the repository and to achieve its strategic goals. We have provided aids to help with this process: a worksheet of possible Operational Planning Teams and of questions and tasks the teams should consider.

You may assign some responsibilities to existing groups or departments. For example, you may wish to give the task of hardware planning to an existing technology group. The North Carolina Community College System used existing technology teams to prepare for issuing Requests for Proposals (RFPs) for their repository's software provider and later to review submitted proposals. Each group created evaluation criteria for their RFP section, generating and fine-tuning evaluation questions, attributing appropriate weights to each, and ultimately using the questions and criteria to review their assigned sections of proposals submitted in response to the RFP. This approach ensured each area of a proposal was evaluated by individuals with enough knowledge to make informed judgments. The project team felt it also helped to reduce evaluation bias by distributing the review process over a larger number of people.

North Carolina's approach may be used in other planning situations as well. As suggested earlier, when you involve those who have specific knowledge of each repository area at the beginning, they become invested in the project and its goals.

Each task in the Operational Planning section of this document requires people with different skills and areas of expertise. Take care that all of the following areas are assigned to appropriate groups or individuals:

- Policies and procedures (including users, content, metadata, quality review, digital rights management (DRM) and copyright, and maintenance)
- Technical Infrastructure (including software, hardware, hosting and facilities, and bandwidth)
- Project schedule, budget, and staffing
- Fiscal tasks
- Change management

Resources

Operational Planning Teams Selection Worksheet (See Appendix 3)

North Carolina Community College System RFP: http://preview.oncoreblueprint.org/_doc/NCCCRFP.pdf

Operational Planning & Details

At this stage, the Strategic Planning Partners will have dealt with many of the broad issues confronting every new repository and will have assigned people to Operational Planning Teams to address the detailed, specific planning needed for implementation. This section of the Blueprint presents the items that these operational teams should consider. Some of these areas will overlap. A repository is a complex system with many interconnected parts; not all planning details will fit neatly into a single category. The various Operational Planning Teams should work together when necessary to ensure that overlapping areas are fully covered. We have included a worksheet of possible operational planning teams and task groups.

We generally recommend a staged implementation, beginning with a small pilot implementation. This allows you to test various aspects of your plan. You will be able to identify any bugs in your hardware or software systems and solve those problems prior to your repository going statewide.

Document the detailed planning decisions you make by completing the provided worksheets. This information may prove useful when securing funding. The various planning teams' records can easily be used to assemble a business plan or other planning document.

Results of this Step:

- Development of policies and procedures for repository
- Software research and selection plan
- Hardware research and selection plan
- Identification of essential repository tasks and staffing needs
- Development of change management and marketing strategies
- Development of an evaluation plan
- Creation of project implementation timeline
- Creation of draft 3-year project budget

Resources

Operational Planning Teams Selection Worksheet (See Appendix 3)

Policies & Procedures

At this stage, you will develop guidelines and policies for many areas of your online content repository. We recommend you plan to revisit these policies periodically to ensure that they are working as intended or to respond to any changes in your systems or your users' needs.

The following areas should be addressed:

1. Project Management
2. Repository Users
3. Content
4. Metadata
5. Quality Review
6. Fiscal Planning

Project Management

We recommend a team approach to complete the detailed operational planning necessary to launch a project of this size and complexity We suggest assigning responsibilities for various operational decisions to team members who have expertise in each particular area. It is important to have a project manager or management team who maintains oversight of the whole project and facilitates the sharing of information among the teams. A communication and reporting process is essential to keep the project on track and moving forward.

Repository User Management

Access

The Repository Users Team must decide who has access to the repository and how that access will be granted. This team answers questions such as:

- "Will the repository be open to faculty in my state, publicly available, or open to selected groups or individuals?"
- "Will users be required to apply for an account?"

Many of the stakeholders identified earlier will become your repository users; this team should consider the best way to meet the access needs of these groups.

Other repositories offer examples of a variety of ways for users to access their resources. . Connexions (http://cnx.org/) and Wisc-Online (http://www.wisc-online.com/) are both open to the public. For both, a new user simply registers for a free account and is then able to use the repository. Wisc-Online users may search and use the learning objects in the repository. Connexions also allows any user to contribute resources to its repository. Both repositories use open source software that they developed in-house and have no software licensing constraints that limit the number or types of users.

The Orange Grove uses proprietary repository software which is priced based on the number of licensed users in the system. Given this constraint, The Orange Grove developers determined that the repository would offer accounts only to Florida educators, but allow guest users to have access to any available public resources. Also it was decided that, as a K-20 repository, some materials appropriate for higher education coursework might be unsuitable for younger students. Thus, educators have access only to those materials appropriate for the level they teach making it more efficient for them to find suitable resources for their students.

The Repository Users Team should also determine how users will acquire their accounts. Several different methods are possible. Both Connexions and Wisc-Online allow users to self-register by completing and submitting a short online form available on the repository homepage. Another method is to have staff members responsible for entering user information into the system and establishing permissions. In The Orange Grove, educators who request an account submit their information to the project staff via email. The project manager then creates an account for them. Guests can login to view and use publicly available resources. A third method is to integrate the repository directly into statewide or institutional Learning Management Systems (LMS). If the repository software can be integrated into the LMS, users can be automatically added to the system and authenticated when they enter the repository through their LMS. The Orange Grove is pursuing this third option because it not only lessens the burden of account management by the repository staff, but allows users to access the repository through their familiar LMS interface. The repository is then only one click away from their course interface; The Orange Grove project team believes this option will facilitate use.

User management

Depending on your software capabilities, user management and associated issues such as establishing usernames, passwords, and groups and roles (including contributing, reviewing, editing, accepting, rejecting, and deleting resources) may be centralized or de-centralized functions.

An important user management decision that has long term impact is the chosen convention for user names. When The Orange Grove repository began, staff gave little thought to user name formats, and user names were created using the first name initial with last name (tsmith). Because the software did not provide a field for the full names of users as a method of further identification and discrimination and the number of accounts grew it soon became difficult to locate individual users. Some confusion and duplications resulted. Now The Orange Grove uses the standard: last name_first name. Another approach might be: institution acronym_last name_first name (bcc_smith_tom). This would ensure less duplication across the system and provide additional information about users. Consider what additional information you may wish to capture about your users and the options your software provides.

Integrations with learning management systems (LMSs) may also impact your user conventions. Currently, in Orange Grove integrations, the LMS username becomes the repository username.

User Information

As stated above, the Repository Users Team needs to specify what information should be gathered about each repository user. We suggest you capture general information, such as name, title, institution, and email address. If possible, you may also want your users' areas of expertise to assist you in forming content review teams and establishing communities of practice. This information will support your communication and marketing efforts. User information may also be useful for evaluating and documenting the success of repository services and for future funding requests. Statistics on the number of unique users, communities, and institutions served demonstrate the need for and value of the repository.

User Support

Finally, the Repository Users Team should build a framework for user support and communication. A user support system keeps your repository customers satisfied. Users who receive friendly and timely support to resolve their problems are more likely to reuse your services. Large and small problems normally arise (i.e. forgotten passwords, system downtime, questions about materials in the repository); a structure in place for assisting users through these issues is essential to providing good service. By reporting and tracking such problems through your support system, you will be able to identify training needs and possible defects in your repository software and to suggest future software improvements.

Support systems differ widely in their size and levels of sophistication, but ideally, your system should have several goals. First, we suggest you provide one point of contact for questions and problem resolution. From a single intake point, you might route users to different groups within your support team.

Second, give reliable, accurate, and prompt service. Any contact from your users should be viewed as a marketing opportunity. Even if you aren't able to resolve a problem right away, by immediately receiving and acknowledging an inquiry, you create a positive impression on the user. Of course, this first impression must be followed up with some type of resolution. Conveying a positive and helpful attitude in responding to your users is essential to your success.

Third, view support problems as an opportunity to increase your users' performance level. User problems allow your staff to demonstrate more efficient ways for users to perform tasks or to direct users to self-help materials, such as tutorials, support wikis, blogs, and knowledge banks that can increase their competence with your system, avoiding future problems.

As you cover this section, consider current support systems and structures that might be available to you, or for which you might be able to share costs. First consider how customers should make contact with the support system. Options include: telephone, email, chat and instant messaging, web logging, and fax. If you offer several pathways for contact, consider how queries will be integrated for data management and tracking.

It's best to offer at least two options to your users: for example, if you provide telephone support and the user has difficulty reaching a support person, an email option can allow the user to register their request. Many systems generate an automatic acknowledgement to email support requests. If you provide phone support, it's a good idea to offer a toll-free number.

One rule of thumb to use in planning staffing is to provide one support person for every 90–250 customers. In deciding the number of staff needed, consider the complexity of your system, the technical level of your users, and if your users are mobile or stationary. If your system is complex and your users are technically advanced and access your repository from a variety of locations, you will experience more complex problems and need more support staff. If your users are less experienced technically and consistently access your repository from one or two locations, you should need fewer staff.

Consider assigning support tasks to staff members that have other duties besides responding to support requests. Most support staff members suffer “burnout” if they are expected to respond to users for longer than around 5 hours a day, particularly when providing telephone support. If your support staffers are tired, they also tend to make mistakes and their customer-friendly attitudes suffer.

Finally, decide what type of data you would like to collect from the support system. What data you collect will depend on the complexity of your support system and number of users served. If you have a highly automated telephone support system and a number of support staff, you may want to measure how long your users have to wait to reach a support person, how long it takes the support member to resolve the problem, and the length of time required to document each call. The percentage of calls that are resolved upon first contact (without the need for the user to contact support a second time) can also be a useful metric to highlight your support staff’s level of competency related to the complexity of your support requests. If you have a large support staff, it’s useful to survey this group for their perceptions of the effectiveness of the system and to identify areas for improvement.

Other metrics useful to even small support systems are tracking the type of problems or issues reported. Knowing the peak times or dates when support requests are generated will help you staff your support system more efficiently. Customer satisfaction surveys also give feedback on the effectiveness and the quality of your support system.

Resources
Repository Users Team worksheet (See Appendix 4)

Content

A successful repository must contain a sufficient number of quality resources useful to its stakeholders. During strategic planning, high-level decisions were made regarding content such as: the type of content the repository will house and how it will be acquired, possibly including creating content, licensing content or collecting it from existing sources or both.

Using the decisions made by the Strategic Planning Partners, the Content Team's job is to draft a concrete set of priorities, guidelines, and policies for content acquisition and management. Then the team should brainstorm about what tasks are needed to implement these decisions.

Content Types

The Content Team reviews the Strategic Planning Partners' decisions on the content subject areas to be covered in the repository and then establishes relevant priorities, policies, and procedures to acquire that content. The team should determine what types of content (subjects and educational levels) should be acquired first. For example, The Orange Grove first concentrated on acquiring and developing content for college algebra. The Quality Review Team will establish policies related to quality control of content.

Content Organization

The Content Team must decide answers to the following questions:

1. Will the repository create one large collection or multiple collections? If there are multiple collections, how will these be organized, made visible, and accessed?
2. Will any content be restricted to our state or to other groups, due to licensing?
3. What parameters/policies will govern the creation of collections? For example, are defined groups allowed to have their own collections?

Content Acquisition

Once the priorities for content types are established, the Content Team should explore the best methods for acquiring content for the repository.

One possible method is to locate sources of existing content and determine if and how it can be collected. Existing content can come from a variety of sources. The following are methods to consider:

- **Use or repurpose existing state-level content.** Many states and statewide institutions have created content that might be added to your repository. The University System of Georgia repository began with a goal of sharing e-Core content, the general education courses already developed within their university system through state funding. Georgia faculty members requested that they be able to use small pieces of these courses. The courses were disassembled and divided into learning objects or small lessons, then placed in the repository for faculty use. More faculty members used the existing course materials and applied the materials to other courses, not just those for which they were originally designed.

- **Solicit content from faculty and institutions**. Faculty and institutions within your state can be a rich source of content for your repository. Many faculty members and K12 instructors are already creating content for use in their own courses, both online and hybrid. Some institutions may have dedicated staff and resources who create content for institutional use. The challenge is connecting with content creators to solicit contributions to the repository. The Orange Grove continues to identify instructional and faculty developed content via a network of statewide institutional contacts. Our long term goal is to establish paid regional champions who will maintain contact with all the institutions in their region, ensuring a steady stream of repository contributions and who will also support their region's use of the repository.

- **Harvest and federate with other repositories**. The advantage of a "standards-based" repository is that it can share and exchange information with other standards-based repositories. This allows

your repository users access to content from not only your repository, but from harvested and federated repositories and collections as well. There are a number of methods and protocols for achieving this inter-repository sharing including

- Open Archives Initiative (OAI) harvesting,
- Open Service Interface Definitions (OSIDs),
- Search/Retrieval via the Web/URL (SRW/U), and Z39.50/ZING.

You should investigate each of these standards to determine which protocol would best benefit your repository.

The Orange Grove engages in both the Open Archives Initiative (OAI) harvesting and in federation.

Harvesting allows The Orange Grove servers to access other repositories and "harvest" the metadata of the resources stored on their server. That metadata record is stored in The Orange Grove and is searchable by its users. If a user wishes to access the actual item, they follow a link from The Orange Grove to the repository where the item resides.

Federation also allows repositories to share content. A user's "home" repository acts as a portal to the federated repositories. The federation agreement allows a logged-in user to be "authenticated" for access into the federated repositories, rather than having to log into many different repositories. The Orange Grove currently federates with the University System of Georgia, MERLOT, the Library of Congress, and a number of other repositories and collections.

To enable harvesting or federation, the Content Team should identify likely partners for these activities. Online research and networking will help you locate other repositories that offer the type and quality of content to meet your needs. Once identified, the team should review their websites for relevant information related to harvesting or to federation agreements or contact staff to determine if your repository is eligible.

The Orange Grove team has noticed an increase in the number of collections enabling sharing protocols and anticipates that this trend will continue.

- **Enter into agreements with publishers**. Publishers recognize the benefits of licensing and distributing their content electronically in a modular format. Many are beginning to license content for use through their own repository or statewide online repositories. One example is The Orange Grove's relationship with the National Repository for Online Courses (NROC). The Orange Grove pays a license fee to NROC. Appropriate Learning Object Metadata (LOM) cataloguing information is associated with each resource prior to the NROC content being placed in the repository for user access. With either purchased or licensed content, the repository must clearly state the rights granted by the license and control access to authorized users.

- **Access student-generated content**. As part of their coursework or as class projects, students often create items that could be used as learning objects or assets. Some may be high-quality and valuable additions to your repository collection. Your Content Team will need to establish a policy about accepting student generated content for your repository and then who is responsible for collecting, reviewing, and contributing these items.

- **Create content**. Originally many repository initiatives created or developed all or most of the needed content. Generating content requires a substantial investment of time and resources. Producing a quality learning object often requires a team consisting at minimum of a subject matter expert, an instructional designer, and web programmer. Depending on the complexity of the material and the programming necessary, additional staff may be required.

Sometimes, a repository is an outgrowth of a group already engaged in learning object development. For example, Wisc-Online was created with WTCS grant funds to store learning objects created by the Wisc-Online development team. Today, participating Wisconsin Technical Colleges contribute $8,000 annually to Wisc-Online. In return the Wisc-Online multimedia developers create up to 8 learning objects for their faculty each year. Kay Chitwood, Director of Wisc-Online, suggested that one of the reasons their repository has been successful is that the faculty do not have to be skilled in the software used to create learning objects. Faculty provide subject matter knowledge and their teaching ideas to Wisc-Online staff who create learning objects for the repository.

If your team decides to create repository content, review what is required to develop quality materials—adequate staff, time, hardware, and software development tools. Be sure to consider what resources are at your disposal such as commercial providers, faculty, institutional staff, or students. For example, WISC-Online engages the college language department faculty to translate resources into other languages.

Format

Another task is to determine the approved formats for resources and learning objects. The Content Team may need to coordinate with the Technical Infrastructure Team to ensure that the planned hardware is adequate to support the selected formats. For example, if you intend to stream audio or video content, you may require a streaming server. You will also need sufficient bandwidth available for desired applications.

Consider how you will store the content in the repository. There are two methods for storing content within the repository:

- Resource files and metadata are stored on the repository servers
- Links to the resources and metadata are stored on the repository servers

Each approach has benefits and drawbacks. If the resource files are stored in the repository, the content management responsibilities rest with the content owner or repository staff. Content control is maintained in-house and the staff is completely in control of the items. A URL to items stored outside of the repository saves storage space and eliminates the need to update the content if changes are made to the files. However, any change to the URL can break the links, rendering the content inaccessible to the users. The Orange Grove uses a combination of these methods. Some content is physically stored on The Orange Grove's servers, while other materials are accessed via links. Whatever method you select, you must add either the items themselves or the relevant links to your repository.

If you plan to store the actual files, you need to determine what types you will accept (e.g., single file, zip file, IMS/SCORM package, executable file).

Accessibility

An important decision is whether or not to restrict access to any repository content. As mentioned earlier, some resources in The Orange Grove are available only to Florida educators. Access is governed by permissions granted by the state of Florida, institutions, or instructors that funded or developed these resources. Restricted access will also be required if commercial content is included in your repository. Usage of these items will be dictated by licensing/purchasing agreements which specify copyright requirements.

Users may have some content they are willing to share widely and other content they feel should be restricted to their group or institution. To address any faculty concerns related to copyright and sharing, The Orange Grove established "collections" within the repository. Each of the colleges and universities in the state system may establish its own institutional collection the administration of which is shared with the institution. Contributors from that institution may choose to submit their items as a public resource (available to all users), a Florida-only resource (available only to Florida educators), or an institutional resource (available only to users who are authorized to access that collection).

Designated collections may be established based on any restrictions the repository chooses, such as in-state educators only, K12 only, or institution only. Establishing institutional collections de-centralizes some quality control and administrative tasks, useful to repositories with limited staff.

If the content is restricted, your team will need to establish permissions, dictating what each type of user is authorized to do. Users can be assigned to groups or roles allowing them to perform certain tasks within the repository such as contributing, reviewing, editing, commenting on or deleting resources.

The Orange Grove maintains a variety of user permission levels that restrict access to resources with licensing requirements and support peer review of contributed items. The levels of user access available in The Orange Grove include Searchers (who can search for, link to and/or download resources from the repository), Contributors (have all Searcher permissions plus the ability to contribute resources to the repository), and various levels of Administrator access for managing repository items and performing other administrative tasks.

Finally, the Content Team should consider any potential accessibility issues that may arise: Research and adopt/create ADA/Section 508 Accessibility conformance requirements.

Copyright

The Content Team should also address copyright and digital rights management issues. For a repository to remain a viable enterprise, the content contributors must feel confident that their creative rights are protected. A repository should have clearly defined policies on copyright and digital rights management of a contributed item. Policies may vary among institutions regarding who retains rights to faculty created content. The content team must research these policies.

The Orange Grove uses a Creative Commons (http://creativecommons.org/) Attribution Non-commercial Share Alike (by-nc-sa) license as the default copyright statement. This license lets others change and build upon the resource for non-commercial use. New works must give credit to the original author and must be licensed under the same terms. Contributors to The Orange Grove may leave the rights statement as it is or substitute other copyright restrictions for their contributions. Creative Commons offers a variety of licenses which feature different levels of copyright restriction. GNU General Public License (http://www.gnu.org/copyleft/gpl.html) is another popular type of open license for products. The team should also consider issues surrounding digital rights management (DRM). DRM describes technologies used to limit the usage of media by preventing copying or conversion by users. When media—music, videos, and animations is included—especially those produced by a commercial provider—staff, users, and contributors need be aware of the terms of usage.

Content Maintenance

The team should also determine a maintenance schedule for content once it is in the repository. We recommend that content be reviewed periodically to ensure that material is not outdated or superfluous. One rule of thumb is to review content at least every three years. The software should be able to assist you in the tracking and identifying resources in need of review.

If you house external URLs in your repository, links may break or not function properly. Some repository software automatically review links and provide notification of broken links. In The Orange Grove, a date for review of the materials in each collection is set within the software. When the item reaches the designated “age” for review, the owner of the item is notified. The Orange Grove repository software also includes a URL checker that notifies the owner/contributor of an item if a link is broken.

Resources

Content Development and Acquisition Worksheet (See Appendix 5)

Metadata

Content must be described appropriately so that users may easily find it. The descriptive information associated with each repository resource—similar to an entry in an library online catalog—is known as *metadata*. There are internationally recognized metadata standards to choose from such as Dublin Core which has 15 fields to the IEEE Learning Object Metadata (LOM) which when fully implemented has over 130 fields. All of the Dublin Core metadata fields are included in the LOM metadata schema. We recommend, at a bare minimum, that the Dublin Core fields be used. Sufficient metadata is the key to precisely locating the appropriate resource within your own repository. Metadata also enables the cross sharing of resources from one repository to another. For example, if Repository A uses Dublin Core metadata fields and Repository B uses IEEE LOM v 1.0, both repositories can communicate metadata to each other through a crosswalk of the related fields.

Dublin Core and the IEEE LOM both require common fields such as the resource title, author, description, relevant keywords, and copyright statements. Fields are classified as "required" or "optional". A chart comparing these two commonly used metadata schemas (as well as those used by The Orange Grove and the University System of Georgia's repository) is included here. You may wish to include other elements depending on which schema you choose. Because collections can quickly become extremely large, a key repository function is to perform targeted searches for resources. If each repository item has robust metadata, users will more likely locate resources that exactly match their specified needs.

Your Metadata Team should review Dublin Core, LOM, or CanCore to select a metadata schema for the repository. You may wish to customize one of these schemas by adding additional fields or controlled vocabularies. In Florida, we have embedded the following in the contribution wizard which generates the metadata for each repository item.

- Postsecondary Statewide Common Course Numbering system database,
- K12 Sunshine State Standards database,
- GEM (Gateway to Educational Materials) Subjects and Assessment vocabulary, and
- ERIC (Education Resources Information Center) Thesaurus controlled vocabularies

A controlled vocabulary is a list of standardized terminology for use in indexing and retrieval of information. Subject headings in a library catalog describing the libraries holdings are an example of a controlled vocabulary. A controlled vocabulary ensures that a subject will be described using the same preferred term each time it is indexed, making it easier for users to access all information on a specific topic during a search. (OECD Glossary of Statistical Terms, http://stats.oecd.org/glossary/detail.asp?ID=6260)

The Orange Grove began metadata entry using the required fields recommended by the SREB-SCORE metadata guide. The SREB-SCORE group reviewed the IEEE LOM v 1.0 metadata and recommended requiring a subset of those elements that were most relevant to education in 2005. (See the SCORE User Guide.) However, The Orange Grove has since reduced the number of required fields to approximately 19 (see the provided chart of LOM fields).The University System of Georgia also began with the recommended SREB-SCORE LOM elements but has reduced the number of required fields to approximately 15. A chart illustrating the various metadata fields can be found here.

The Orange Grove staff has found that presenting metadata to the user is a dynamic process in which you continually discover enhancements that improve system usability and metadata accuracy. For example, we found that by adding controlled vocabulary databases (e.g., statewide course numbers and ERIC Thesaurus terms) we facilitated the selection of terms via drop down lists, check boxes, and similar mechanisms. This sped up metadata information entry and improved its accuracy. The Orange Grove incorporated the following as databases into its LOM v. 1.0 Classification field:

- ERIC Thesaurus,
- Florida statewide course numbering system,

- GEM Subjects,
- GEM Assessments, and
- Florida K12 Sunshine State Standards

Remember that controlled vocabularies require periodic updating, which necessitates importing the updated database into your system.

You will also need to decide how to collect the metadata for each item. Will the contributor complete all or some of the metadata fields, or will a staff member add appropriate metadata to the record? We suggest first having the contributor complete the metadata then having a staffer review the metadata following your established repository quality standards, at least during the initial implementation. The types of metadata errors discovered during the review will help you target future training efforts or support needs. Also consider whether or not you wish to vary the required metadata fields according to the type of resource contributed. For example, an asset consisting of a single image will need less contextual information than a complete learning object, and you may wish to designate fewer required fields.

A contributor to The Orange Grove must complete the *required* metadata fields when entering an item in the repository. During the entry process, metadata information is selected via a series of dropdown menus, radio buttons, text fields, and free text for a few fields. There are both optional and required fields. Contributors may elect to share ownership of an item allowing another person to complete some of the metadata fields. The Orange Grove employs a part-time metadata reviewer to evaluate the submitted metadata for accuracy; individual institutional members may also implement a review process to ensure accuracy of metadata.

Resources
Metadata team worksheet (See Appendix 6)
Metadata Schema Field Comparisons chart (See Appendix 7)

Quality Review

The Quality Review Team decides how to evaluate content before it is accepted into your repository. Ideas about quality review vary widely among repositories. Some repositories have strict guidelines and review policies for content quality, while others have few or none. For example, Rice University's Connexions allows anyone to contribute resources with no review imposed. The Connexions philosophy is to make the resources available, but not to endorse the quality of the items. Quality is to be determined by the users. However, if users consistently find resources that lack accuracy or educational value, repository usage will decrease over time.

In contrast, other repositories mandate a defined level of quality. Intute, a UK-based repository of web resources, has a network of subject specialists who select and evaluate the websites in their database.

There are a variety of models for repository quality review. We will discuss two basic strategies: a centralized model and a distributed model. Repository software can attach a review process to items enabling more than one individual to perform a review asynchronously. In the centralized model, repository administrative staff performs the reviews. This centralized control maintains process integrity by determining who reviews the materials and the review criteria. Even with specified criteria, differences in interpretation may arise; a centralized model provides the opportunity for immediate discussion. In a distributed model, the reviews are dispersed, perhaps among institutions or state agencies. While this reduces the burden on repository staff, more deviations from the established process and criteria are likely. Such a system also requires more active communication and training for the reviewers.

As you set up your quality review process, we recommend at least a minimal review of contributed items. This will establish a review process as part of your repository culture.

The Orange Grove mandates a quality review process to ensure resource accuracy, instructional and editorial quality, and adherence to the repository technical and metadata standards. For each defined resource type in the repository, a virtual quality review process from one to five steps is required. Items may be reviewed by the following:

- **Subject Matter Expert (SME)** to ensure content is accurate, usually performed by faculty (other than the resource author) with subject area expertise.
- **Instructional Designer** to ensure that the content aligns with the resource's objectives and that it contains appropriate events of instruction. This review is not required for content that does not contain instructional components or does not have an instructional purpose: e.g., syllabi, lesson plans, pictures or charts, and presentations.
- **Editor** to ensure correct grammar and spelling.
- **Technical and Accessibility Valuator** to ensure that IMS/SCORM packages conform and that content displays correctly in a learning management system. If ADA requirements are to be met, the valuator confirms standards are met.
- **Metadata Reviewer** to review metadata for sufficiency and accuracy.

Resources

Quality Review worksheet (See Appendix 8)
Orange Grove Review Process (See Appendix 9)

Fiscal Planning

Using the output from the Leadership and Strategic Planning Partners, the Fiscal Team must verify and plan for start-up and continued repository funding. To begin, the Fiscal Team should gather and verify the details and timelines for obtaining funds that are already secured or promised. They should also determine the amount of funding available for initial implementation and maintenance. If the Strategic Planning Partners identified other potential sources for additional funding, this team should begin seeking those funds by prioritizing the possible sources and beginning to investigate the steps needed to acquire them.

If fees are collected for defined services, this group will determine the amount to be charged and procedures for collecting and disbursing. Fees may be structured in a variety of ways. We recommend that the repository be free to members, groups, or institutions who contribute to its creation or upkeep and to other repositories with whom you federate or harvest resources. The Fiscal Team should carefully research and consult with appropriate state agencies on what state laws or policies govern the collection of fees. If your state opts to charge fees, be sure to require e-commerce functions in your repository software selection.

Many repositories are state-funded while others are self-sustaining and rely on grants, e-commerce, or some combination of funding sources. The most successful repositories have core state or institutional funding and may also receive grant funds. Repositories, such as CAREO, have closed due to reliance on grant funds and lack of system support. You must ensure that funding is in place for the repository to maintain services as well as to expand as needed.

Wisc-Online offers a mixed funding model. The Wisc-Online repository and learning object development team receives funding from each participating technical college. The development of online training resources for small and large corporations provides additional income for content developers. Wisc-Online also offers training to states and institutions on how to

- effectively use learning objects, and
- create customized educational resources and training.

Technical Requirements

In addition to establishing the policies and procedure for your repository project, you will need to appoint a team to select the technical equipment and services needed to start and run your repository. A robust hardware system is required to store the repository's materials. The team selecting the hardware should also research what is needed for hosting services, bandwidth, and facilities. Finally a team must choose a software platform that will allow users to easily access your repository’s materials.

- Software selection
- Hardware and system selection

Software Selection

Selecting repository software is one of the most important decisions you will make. The selection team must review the output from all the previous planning groups to determine what decisions were made that impact software requirements. For example, if fees are to be collected, your software will need to have an e-commerce function.

The Software Selection Team should research and address a number of key factors. When North Carolina initiated their repository project, a detailed request for proposal (RFP) was created through the input of multiple teams who enumerated all their software requirements. Below is a list of considerations adapted from North Carolina's RFP.

Existing Software or "Home Grown"

Do you plan to develop your own software or use an existing product that is either an open source or commercial one? Many of the repository developers and managers interviewed for the Blueprint designed specific software for their repository. Developing your own software ensures maximum control over the features and specifications your repository needs; however, doing so requires that your project have access to programmers, developers, and other technical staff with the requisite high-level skills for this type of development.

Open Source or Commercial

Once you decide to use an existing software product, the next decision is whether to use open source or commercial software. Each option has assets and drawbacks; your team will want to weigh these fully as it investigates software possibilities. Open source software may allow greater flexibility to edit and customize the program code to meet your project's needs. According to Open Source Initiative (http://www.opensource.org/), "The promise of open source is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in." However, such flexibility requires the services of programmers or a third party who is able to create and modify the system to meet your needs. While an open source package may offer savings in terms of licensing, you may ultimately have to expend more in staffing and programming.

A commercially licensed vendor might include programming support in your financial agreement, but you may have to sacrifice the convenience of being able to make modifications to the system in house. In addition, you are subject to the availability and responsiveness of the vendor's programmer. When making this decision, your selection team must consider available staff and your repository's access to skilled personnel.

The selection team should also determine the number of users a software package can support. While open source software generally has no restrictions on user numbers, many commercial products have varying fee levels depending on the number of users. Sometimes a "buy out" of the software is possible. Normally, this includes the payment of a lump sum to own the software for system use. Even if the system is "bought out," you will probably have to pay a yearly maintenance fee, probably about 20% of the total purchase price. If your project starts with a small pilot implementation, consider beginning with a small number of licenses and increasing the number as the repository expands. Florida began its pilot implementation with 500 faculty licenses or seats.

Metatagging and Discoverability

Discoverability of content is essential. A quality repository must enable users to precisely and easily locate content. Being able to retrieve the metadata associated with each item is the key. Repository software must allow customization of your metadata schema and crosswalks or communication with other repositories that employ a different schema. Carefully evaluate the software to determine its ability to handle multiple metadata schemas or the customization of the metadata schema. Can it include information unique to your repository? The team should also explore methods available for entering the metadata:

- Does the software have a template or wizard that assists users in attaching the proper metadata?
- Will you be able to specify which fields are mandatory and which are optional?
- Can you duplicate metadata records and reuse them for another resource?

- Can you bulk upload metadata records?

Also consider how your users search. Will they access the repository knowing exactly what they want, or will they be able to browse within subject areas? What types of terms will be used to search? Search terms can vary widely, from controlled vocabulary lists with predetermined search terms to free text searches that allow a user to enter any terms they wish. You may want to consider a combination of these options. The Orange Grove allows searchers to locate information in a variety of ways. They may enter their own keywords or select from a number of preloaded, controlled vocabulary options (i.e. Sunshine State Standards (K-12), common course numbers (postsecondary courses) and both ERIC and GEM search terms). Your team must determine whether or not your software selection will support all of your options.

Personalization
Another useful software function is to personalize the repository experience. Will users be able to create and maintain a personal profile? Will they be able to save or bookmark resources that they use often or tag resources as favorites? An RSS (http:/whatisrss.com) feed that notifies a user when new resources are added to the repository is also a nice feature.

User Management
The specifications for your software system will dictate how users are managed. The selection team should consider the following:

- What types of permissions are to be granted to the user?
- Will users be assigned to more than one group?
- Should accounts be enabled or disabled by the repository manager?
- Will user's login or account history be tracked?

Content Upload & Management
The selection team must consider how content is uploaded into the system. They must determine both the process users will follow to upload a file as well as the possibilities for batch upload of content. are Other important considerations include management issues such as:

- setting up and managing workflows for content creation or quality reviews,
- setting copyright/access restrictions, and
- ensuring access for persons with disabilities

The team should also consider what tools the product contains that will allow users to edit or repurpose content to meet their specific needs. Users may wish to comment on content and have those comments visible to other users—a peer rating mechanism allowing users to share how a particular resource was used and how well it worked.

Presentation
Examine and consider how the online repository will appear to repository users. Is the interface simple, attractive, and easy to use for not-so-technically-savvy persons? Will the repository provide any tools to assist users in creating new items that include one or more repository resources? Is collaboration supported? If so, how flexible will that system be? A simple process to contribute resources, link to resources, and download resources is always best.

Integration and Interoperability
Ideally, a repository should integrate easily with multiple repositories and with multiple learning management systems (LMS) such as Angel, Blackboard, Desire2Learn, Sakai, or Moodle. This is especially useful for higher education faculty members, many of whom are now accustomed to their institution's LMS. Integration should allow faculty to log into their LMS and have seamless entry into the repository without requiring additional log-ins. You may want your system to employ Lightweight Directory Access Protocol (LDAP), which allows a single sign on and one password per user to be shared between many services.

Customization
Some software products provide customization of many aspects of the repository management system. Users may wish to change the appearance of the interface. The team should examine the software's capacity for customizing branding text and graphics.

Data
The selection team must also evaluate your project's need to collect data on repository usage, as well the ability to quickly and easily produce statistical reports with information such as

- total number of items,
- information on items under review,
- weekly usage,
- user log-in times, and
- number of external queries.

Automated tracking and reporting on any nonfunctioning URLs within the repository is also valuable. Some repositories also track student performance data, through integration with their course management system. Institutional, departmental, district, or state level entities may also want to collect various types of user information or usage reports.

Installation and Support
The team must also investigate what support the vendor will provide as well as what in-house support staff will be needed. What sort of training is available and recommended for users, system administrators, and other staff by the vendor? Is this included with the software package?

Resource Portability
Finally, the team should consider the portability of your repository resources and the metadata associated with them. At some future point, you may need to migrate to a new software version or to a new software platform.

The team must consider all of these factors in selecting your repository software. They will also need to work closely with the other Operational Planning Teams to ensure that the selected software accommodates the policies and procedures established in each area. Also essential is determining the available budget for the project and deciding how much can be invested in software purchase and licensing as well as in the maintenance and ongoing updating of the package.

Resources
Open Source Software Review Report
http://www.oncoreblueprint.org/_doc/LOR_OSS_Report_10Dec2009.pdf

Open Source Software Review Technical Specifications
http://www.oncoreblueprint.org/_doc/LOR_OSS_Report__TechFeatures_10Dec2009.pdf

Hardware Selection

In developing a hardware plan, you should consider a number of factors. This task should be delegated to a group with enough specific knowledge to research and select the appropriate system requirements for the project's needs. The Hardware Selection Team should work in close cooperation with the Software Selection Team to estimate hardware and system infrastructure requirements and to ensure an RFP that contains the necessary requirements to meet the repository's hardware needs. The scope of the initial implementation will also impact hardware requirements for start up and for scaling (discussed in more detail later in the Blueprint).

Some considerations when selecting a system:

- **Network and system availability.** System availability must conform to customers' service hours. A consistent maintenance period is required for maintenance and backups. Different types of users will access the system at different times. Instructors may need to access content during the day to compose their lessons, while students are notorious for working late into the night. Generally, maintenance is best scheduled for early morning hours, a time least likely to disrupt users, e.g., Sunday morning between midnight and 6 a.m.

- **Network and system capacity**. The selection team should require that the hardware selected and purchased meets capacity needs of the network and system for at least a three-year life. This ensures that equipment will remain current and of high quality while in production and will still be viable for non-production purposes after the initial purchase, (such as for use as a test server). Network capacity must be monitored and additional bandwidth available on demand.

- **Network and system reliability.** The Hardware Selection Team must also require the design of a network and systems that ensures reliability for users. Generators and universal power supplies (UPS) are needed in case of power outages or other unforeseen disasters. Technical systems must have redundancy, such as fail-over hardware and a frequent system back-up.

  When any new product is introduced to the system, technical staff should analyze what is necessary to make the application available, 24/7. The repository should be accessible to users at all hours and available on the users' demand.

  A multi-tiered development environment helps ensure reliability. Production and development areas should incorporate managed change control. Ideally, this should include a test server on which to try out any new software or programming changes. This allows for experimentation without harming the repository or having to take it offline.

  A stringent maintenance contract or onsite backup hardware should protect all networks and systems.

- **Network and system backup and operational recovery**. Network and system backup and recovery services are essential. If a catastrophic event befalls the system, you do not want to lose any of the repository's content, user accounts, or other information. The Orange Grove has contracted with SunGard Availability Services to provide hardware and network replacement in the event of a disaster.

  The Hardware Selection Team must establish a schedule for maintenance and back-up of the repository system. This protects your content so that the work and time spent collecting, reviewing, and cataloging is never lost. The Orange Grove performs a differential back-up nightly so that all content added during the previous day is saved. A full back-up is conducted weekly, and the system is re-booted weekly as well. The back-up files are stored in a separate location. The Repository and System Maintenance Team may need to coordinate with the Technical Infrastructure Team to determine a schedule that allows for necessary system maintenance, but does not lead to downtime that would affect users.

- **Scalability to meet long-term system and network requirements.** Scalability must be built into your system to allow your repository to grow and expand and increase the number of users. The system design should make it easy to add capacity. Blade or rack servers that can be easily adapted for increased power are recommended. Geographically separated mirror sites also may be an option.

- **Content driven technology needs.** In selecting the technology, the Hardware Selection Team must consider the Content Planning Team's decisions regarding types of materials to be housed in the repository. For example, if streaming audio or video is to be available, a streaming server will be necessary.

Categorization of projects
Your hardware needs will be dictated by the size of the project. Your Hardware Selection Team must consider the size of the initial implementation as well as future plans for scaling up the repository.

Both very large scale and small scale repositories determine limited hardware and software choices. Very large repositories may challenge or exceed the capacities of the existing enterprise infrastructure and technology solutions available from vendors. Thus, their design and implementation require custom work by senior architects and software engineers, and the choice of hardware and software will then be made by a system integrator. Because small scale repositories are likely to be constrained to existing infrastructure and off-the shelf applications, they also have limited choice of technology.

On the other hand, large and medium scale repositories are less constrained by their technical requirements, the enterprise infrastructure, or a pre-existing hardware and software platform. For better or worse, they have a somewhat wider range of choice among several hardware and software products and services to satisfy their requirements.

To further complicate implementation, large and medium scale projects are often in transition from a smaller to larger scale. Consequently, decisions about technical infrastructure for these repositories involve not just raw matching of requirements to technology, but trade-offs between

- current and future requirements,
- temporal necessity and architectural model or long range goals, or
- growing requirements and limited budget or staff.

To cope with the inevitability of evolving needs and changing resources or constraints, your selection team should preserve choice and flexibility by isolating functionality into tiers or service components that can be implemented or switched relatively independently. Aids to maintaining separation of function are

- reference models,
- design standards for data structures, interfaces, and communication, and
- product families.

For example, hosting the user interactions and the search service itself on separate servers will allow the volume of usage and the size of the repository to grow independently. Similarly, isolating application and repository functions from system functions such as switch capacity or bandwidth will allow the latter to grow or change without disrupting the former.

The following lists contrast the characteristics and risks of larger, smaller, and in-between repositories and projects.

Larger scale repository projects
Characteristics

- Mission critical function for the parent organization
- Budgeted expense
- 1000s of multimedia entries that will persist online or in separate storage
- High growth in number and frequent updating or modification of entries
- Several kinds of high-use applications for faculty, students, and librarians (authoring, research, teaching and learning, archiving, etc.)
- 1000s of simultaneous users with a wide range of competence and experience who expect support
- 24/7 availability and reliable response time
- Integrated policy for securing intellectual property
- Integrated policy for protecting user privacy
- Dedicated staff or contracted services for technical support, disaster recovery, and maintenance
- Supporting materials and training services provided

Risks

- Broad and costly impact of downtime or loss of data
- Unforeseen impact on the limits of enterprise system capacity or performance
- Non-compliance with organizational, state, or federal policy or regulations
- Unforeseen obsolescence due to technology evolution or marketplace activity

Smaller scale repository projects
Characteristics

- Not mission critical for parent organization
- Special budget or outside funding
- Fewer than 1000 entries of primarily one media type that individuals provide and maintain
- Primarily one type of user-facing application (portal, browser-based app, LMS)
- Less than 1000 supported users, most of whom are familiar with the repository entries and how to use the repository
- Slow increase in number of entries and number of users
- Users tolerant of interruptions of availability, delayed response times
- Informally enforced security and privacy policy
- Little or no support staff or user documentation
- Ad hoc staff

Risks

- Loss of users due to slow response, inadequate support, etc.
- Ad hoc choices preclude growth or evolution
- Interruptions in or loss of service due to funding gaps, personnel changes, etc.

In-between scale repository projects
Characteristics

- Critical function for parts of parent organization
- Ad hoc funding from regular and special budgets and outside sources
- Accelerating growth in entries, users, and types of users
- Increasing expectations for availability, user support, formal policies, etc.
- Decreasing tolerance for downtime, lack of support materials, slow response to change requests, etc.
- Growing budget and staff requirements

- Increasing exposure to organizational, state, and federal policies and regulations

Risks

- Losses from competition for funding and staff
- Liability from non-compliance with policy or regulations
- Disruptions in service due to changes in governance, operating procedures or technology base
- Administrative or operational inefficiency due to lack of differentiation of functions and roles

Scoping repositories

The dimensions and questions below are designed to categorize repository projects on a continuum from very large to small, personal repositories. A worksheet of questions accompanies this section. The questions are obvious and simple. But answers to these questions will reveal—for repositories that are somewhere between these extremes—the details that are needed for informed decision-making about their technical infrastructure.

Size/Usage

How many users do you expect to visit your repository? You may need to come up with two figures, an initial idea and a future projection. As marketing and word-of-mouth and spread, the number of users is likely to increase. You should also consider how many and what type of objects will reside in the repository.

Performance/Availability

It is also vital to consider the needs and expectations of your users. What are the numbers and types of queries users are likely to make, as well as other ways they will interact with the system, such as uploading content? What sort of response time might the users expect from the system? How will you monitor if the users' needs are being met?

Lifecycle of the entries and the repository service

Begin by establishing a timeline. How soon does the repository need to be up and running? You will need to assess your current funding and resources. Consider existing components or staff members available for the project. Think about how you will seed the repository with your initial content and how you will review that content over time. Also consider how the project will grow and move forward and what additional services may be required in the future.

Installation, support and maintenance

A technical support team is critical to ensure that your repository is set up properly and does not suffer from excessive downtime.

- Who will install new hardware and/or software? (Vendor, staff, outside source)
- Who will provide on-going support for the technology, the repository, and the users? (Training, everyday operation, trouble-shooting)
- Who will provide maintenance and repair? (Vendor, staff members, outside service providers)
- Are written agreements in place for the above?

Staffing

In assessing your staffing needs, you will first need to review relevant output from the Leadership Group and Strategic Planning Partners. Staffing needs will vary based on the initial size and complexity of the repository implementation and likely change as the repository grows.

There are three basic steps to develop a staffing plan:

1. **Identify tasks that must be accomplished to get the repository started.** You may want to brainstorm all possible tasks and then prioritize them into those that need to be addressed immediately and those that can wait. You can then decide how to distribute these tasks among existing and potential staff members. We have provided a worksheet to assist you in identifying possible repository tasks. Additional tasks will arise as the repository grows and as you expand your implementation; some previously identified tasks will require more time or additional personnel. Work with whoever is creating your project timeline to ensure that the necessary resources and funding will be available to meet changing staffing needs as the project progresses.

2. **Determine the skill set needed to complete each task.** Having the right individual in a position, especially with a small staff, is critical for success. You might start by grouping together similar tasks that require the same areas of expertise and could be assigned to one position.

   We have provided position descriptions including knowledge, skills, and attitudes preferred in a candidate for three positions:
   - System Administrator/Web Developer
   - Instructional Design Specialist
   - Metadata Reviewer

3. **Assess the skill set of your available staff** for personnel that could be reassigned or utilized on the repository project. There may be existing staff from the Strategic Planning Partners or on the various Operational Planning Teams who are able to dedicate some percentage of their time to your repository project. You may also need to hire additional full- or part-time staff to complete some of the tasks. If funds are scarce, consider assigning the duties of several positions to a single employee, or divide the duties designated for an unfunded position among the existing staff.

   For work necessary to start the repository, but that may not be recurring, contracted staff may be preferable. For example, some repositories have elected to employ contracted staff for programming tasks. This allows the repository project team to remain flexible as new programming needs arise, systems change, or advances are made in the field.

Once you have a draft of your ideal repository staff, consider the financial needs for this staffing plan. You may not need to support personnel who are reassigned to the project (either full- or part-time). However, funds will be needed to pay for any new hires or contractors. Research the average contractor rates or salaries in your area for the various positions you require, and compare these requirements to your project budget allocations. If funding is not adequate to meet your staffing plan, explore any other options that may be available to you. For example, for some tasks, you might consider offering unpaid internships to college or graduate students. Marketing or advertising majors can help you develop and craft promotional messages. Library Science students could attach metadata to repository content. Explore the commitments made by your stakeholder groups. They may be able to offer services on an in-kind basis or through some other non-salaried financial arrangement. For example, a stakeholder might lend you the service of one of their programmers for a few hours a week in support of the project.

Your stakeholder network can be a valuable resource. When The Orange Grove was beginning, we planned to seed the repository with some Sharable Content Objects (SCOs). To achieve this goal,

repository staff collaborated with Daytona Beach Community College (DBCC). Faculty members, developers, and graphic designers from multiple institutions participated in a three-day workshop at DBCC to develop and create SCOs for mathematics courses. The Orange Grove team structured the session and provided instructional design expertise. This session proved beneficial to all parties; The Orange Grove gained a number of SCOs for the repository, the faculty gained experience as subject matter experts, and everyone learned more about the creation of SCOs for their courses. The most valuable portion of the event was participating in the collaborative process.

When you have finalized your project staffing plan, you will need to prepare job descriptions for the required positions. Identify the necessary knowledge, skills, and attitudes (KSAs) required for each job, as well as a description of the duties and responsibilities of the position.

Resources
Staffing Tasks/Roles Worksheet (See Appendix 10)

Sample Position Descriptions
http://www.oncoreblueprint.org/blueprint/phase_I_planning/operational_planning/sample_position_descriptions.html

Change Management

As your group prepares to implement the repository, consider formulating a change management strategy. Change management is a structured plan to facilitate transition to a new way of doing something. When a new technology or any innovation is introduced, some marketing and support is usually required to diffuse or publicize it and get people using it. You will need to connect with, and then educate, potential users about how to use the repository as well as the value of using it. A change management plan will help you approach these tasks in a systematic way. Internal planning, marketing, and training are all valuable tools for achieving this goal.

- Repositories as an innovation
- Diffusing your innovation
- Example strategies
- Training
- Communication

Repositories as an Innovation

Thinking About Repositories as an Innovation

The decision has been made. Your state or your institution has established and made a digital repository available for use by your faculty. Now what? While significant planning and work are involved in setting up and configuring a repository, the most challenging task is to get faculty/people to use it! If you build it, they will **NOT** come **UNLESS** you consider and plan for attitudinal and behavioral changes toward the use of the repository. A useful approach to plan for these changes is to first consider Diffusion Theory.

In *The Diffusion of Innovations* (ISBN-10: 0029266718), Everett M. Rogers defines an innovation as an idea, behavior, or object that is perceived as new by its audience. Rogers regales readers with tales of great innovations that were never adopted and explains why they failed. He presents basic principles to consider and strategies for introducing innovations. A "diffusion plan" in place, may not only make your repository successful, but it might even speed up, and provide the "tipping point" for, mainstream adoption.

The first concept Rogers presents is that innovations are adopted by individuals because they enhance or improve the individual's life in some way. When given an opportunity to change the way they do things, people ask questions such as the following:

- What's in it for me?
- What are the risks?
- What, if any, are the benefits?
- Is it easy or difficult to use?

Potential users of your repository will personally make an informal cost-benefit analysis as they are presented with the new idea. They will consider any related uncertainties surrounding the repository as a major obstacle. They may be unsure that there are benefits to using a repository and consider how it might possibly disrupt their familiar routines. They may wonder if the repository is stable and reliable, or too cutting edge to be useful. However, if they believe that the innovation

- has some advantage to the way they currently develop or select materials,
- is compatible with their values and general habits, and
- is easy to use,

they will probably adopt it.

Rogers classifies individuals into five categories based on their likelihood to adopt an innovation:

1. **Innovators**– early visionary adopters
2. **Early adopter**s – imaginative individuals who are willing to adopt new ideas with personal benefits
3. **Early majority**– accept simple, proven better ways of doing what they already do
4. **Late majority**– will follow mainstream and accepted ideas
5. **Laggards**– often identify real challenges to adoption and are the last to adopt an innovation, if ever

Specific strategies must be developed to attract, interest, and engage each of these groups to learn about an innovation. See page 1 of http://www.enablingchange.com.au/Summary_Diffusion_Theory.pdf for more details.

The Mechanism of Diffusion

Rogers believes that an individual makes a personal decision to adopt an innovation or to remain with the

status quo. Assuming that decisions are personal, rather than authoritative or collective, each member of the social system follows this five-step process in their own innovation-decision:

1. **Knowledge.** The individual becomes aware of an innovation and has an idea of how the innovation works.
2. **Persuasion**. A favorable or unfavorable opinion about the innovation is formed.
3. **Decision.** Actions are taken that lead an individual to choose whether to adopt or reject the innovation.
4. **Implementation**. A person makes use of the innovation.
5. **Confirmation**. In this final phase, each person evaluates the results of their innovation-decision.

For more details on this process, please see:
http://www.stanford.edu/class/symbsys205/Diffusion%20of%20Innovations.htm

Innovators are usually the first to test an innovation. Their opinions become essential to provide important data for the stage 2 *early adopters* from whom opinion leaders emerge. (Opinion leaders are individuals who are able to influence others about innovations.) If opinion leaders embrace the innovation, the largest group, *majority adopters*, will more than likely adopt it as well, leading to the "tipping point" of adoption. The last group, *laggards,* often consists of the assertive skeptics and is difficult to win over.

We recommend that you use diffusion theory as a tool for analyzing your end users and keep the process and groups in mind when formulating marketing plans, materials, and communications.

Resources

- *Diffusion of Innovations*, Fourth Edition by Everett M. Rogers (1995) ISBN-13: 978-0029266717
- A Review of *Diffusion of Innovations* by Greg Orr, Stanford University, March 3, 2003 http://www.stanford.edu/class/symbsys205/Diffusion%20of%20Innovations.htm
- Diffusion Simulation Game:
- Susan Lucas, Professor. AEL 697: *Seminar in Instructional Leadership. Rethinking, Restructuring and Reforming Faculty Technology Development*. http://susanlucas.com/it/ael697/facdev.html

Diffusing Your Innovation

The project team needs to formulate a diffusion plan for informing potential users about your repository project. Here are some basic concepts of diffusion theory that you should consider when developing this plan.

One effective diffusion strategy is to utilize **social marketing**, a planned communication process that applies commercial marketing strategies to bring about a social or behavioral change. Social marketing techniques have been used widely in public health and safety campaigns, e.g., convincing drivers to wear seatbelts or preventing teens from smoking. Applying these methods effectively can help convince people to become users of your repository.

The important concepts in social marketing include: (http://www.social-marketing.org/sm.html)

1. The ultimate objective of marketing is to **influence action**.
2. Action is undertaken whenever target audiences **believe that the benefits they receive will be greater than the costs** they incur.
3. Programs to influence action will be more effective if they are **based on an understanding of the target audience's own perceptions** of the proposed exchange.
4. Target audiences are seldom uniform in their perceptions and/or likely responses to marketing efforts and so should be partitioned into segments.
5. Recommended behaviors always have competition which must be understood and addressed.
6. The **marketplace is constantly changing** and so program effects must be regularly monitored and management must be prepared to rapidly alter strategies and tactics.
7. Marketing efforts must incorporate all of the "4 Ps," i.e.:
    - **Create an enticing *"Product"*** (i.e., the package of benefits associated with the desired action);
    - **Minimize the *"Price"*** the target audience believes it must pay in the exchange;
    - Make the **exchange and its opportunities available in *"Places"*** that reach the audience and fit its lifestyles;
    - ***Promote* the exchange opportunity** with creativity and through channels and tactics that maximize desired responses.

Ultimately, as with all aspects of your marketing strategy, you are striving to achieve **critical mass**. Critical mass is reached when enough individuals have adopted the innovation that the adoption rate becomes self sustaining. Adoption is generally slow until a critical mass is achieved, then it accelerates. Recent examples of innovation adoptions are email, text messaging, iPods, and cell phones.

Next we will consider how you might apply some of the social marketing concepts to convince your target audience to adopt and utilize your repository:

1. The ultimate objective of marketing is to influence action. Ideally, you must encourage your potential users to *choose* to make use of the repository. People cannot be forced to adopt an innovation. If you try to mandate its use, people are most likely to become more resistant to adoption. Generally illustrating the positive reasons and benefits of using the repository to the user is more effective. Your message and marketing materials should be focused toward this goal.

You may want to consider several ways to accomplish your goal. One is to target top officials in an organization's hierarchy for initial adoption of the innovation. If you can persuade the leaders of a group to adopt your repository, the group members are more likely to follow their lead.

Another effective technique for facilitating diffusion, according to Rogers, is to make use of a **change agent**. In the case of a repository as the innovation, this would be a person or group that serves as a communication link and facilitates the flow of information from the project team to the potential users. In the beginning, and probably throughout the project, your project team will act as your own change agent.

In this role, project team members must seize every opportunity to discuss the value of the repository. You should identify stakeholder groups to speak to, present at meetings and conferences, seek out potential users and speak to them directly. As you identify other people who realize the value of the repository, you may want to enlist them to serve as change agents as well. As The Orange Grove team began marketing the repository, they identified "champions" at different institutions within the community college and university systems. These were people who believed strongly in the importance of The Orange Grove and would be able to diffuse information about the project to the faculty and staff at their home campuses.

Rogers also stresses that change agents should identify **opinion leaders**, those individuals who are able to influence others' opinions about innovations. Focusing communication and marketing activities on opinion leaders increases the rate of diffusion. Opinion leaders are different from innovators. Innovators are the first to adopt new ideas, while opinion leaders have followers who look to them when a new innovation is being evaluated. Well respected or popular faculty members often function as opinion leaders on college campuses.

Seek out entire groups to use the repository and strive to have them to adopt all at once. If members of a group adopt at the same time, critical mass can be achieved more quickly. A strategy The Orange Grove has used is to integrate the repository into the learning management system (LMS) at each college or university in the Florida system. Thus, The Orange Grove simply has become another tool available to them via their LMS.

Once the repository integration is accomplished, we deliver faculty training on how to effectively use the repository. Training can be conducted with faculty from a targeted subject area or multiple subject areas.

Another interesting technique is to provide language regarding the use of the repository that any institution or group in your state can include in grant proposals. A statewide repository is an excellent vehicle for disseminating a grant's products, providing storage and making the results easily discoverable and available to a wide audience. Building this language into grants written by your users will both provide content for the repository and as well as raising the repository's profile among the grant funding agencies.

***2. Action is undertaken whenever target audiences believe that the benefits they receive will be greater than the costs they incur*.** When "selling" the repository, it is vital to illustrate the benefits that users will receive by adopting your innovation. These perceived costs and benefits will vary among your different stakeholder groups. You will need to identify the concerns of a particular group and show how the benefits gained will outweigh any costs.

When The Orange Grove staff began publicizing and marketing the idea of the repository to statewide leadership and the state legislature, we focused on the cost savings to the higher education institutions and the State of Florida. We pointed out that consolidating resources into a centralized repository accessible by all educators in the state prevents duplication of effort. We discussed how faculty would not waste valuable time and resources recreating an existing item that could be freely available for use. We demonstrated that the cost of funding the repository would be offset by greater savings in the long term.

In marketing to faculty, we had to overcome the misconception that by contributing items to the repository, the faculty members were "giving away" their work. The Orange Grove addressed this concern through education about the repository's copyright policy.

Faculty who use The Orange Grove can stipulate the terms of use for the items they create and contribute. The default copyright statement in The Orange Grove is the Creative Commons Attribution Non-commercial Share Alike (by-nc-sa) license (http://creativecommons.org/licenses/by-nc-sa/3.0/). This license allows other educators to use or even adapt the item as long as they credit the original author and license any new creations under the identical terms. Since derivative works must carry the same by-nc-sa license, they will also be non-commercial in nature. In addition, faculty can replace the default copyright

statement to retain or give up any copyrights they choose, anything from simply allowing use of the work, but no derivatives, to releasing their resources into the pubic domain. Faculty began to realize that the "cost" of contributing their works to The Orange Grove, was much less than the benefits they would receive in increased exposure and scholarly collaboration. They would not be forfeiting their intellectual property or losing control over their work.

Faculty also perceived the process of contributing resources to the repository as a imposition and thus a "cost." They were afraid that the contribution process would be burdensome. Such a perception meant that they might not choose to contribute. Many felt that since their materials were already available in an institutional Learning Management System (LMS) or on their personal website, there was no need to place the materials in the repository as well. The Orange Grove staff addressed this issue by simplifying the contribution process as much as possible. Required metadata is collected via a straightforward web form with questions and drop down menus. The process is relatively undemanding and requires a minimal amount of effort on the part of the contributor. The Orange Grove staff also illustrated how adding an item to The Orange Grove offers much wider access to, and dissemination of, the faculty member's work. Items posted just to an LMS or personal website are available only to people who know about or have access to those sites. The Orange Grove federates with and is harvested by other repositories, making the faculty items available to searchers all over the world. Repositories also offer stability. If a faculty member changes courses or institutions, material stored in an LMS or website may be taken down or relocated, preventing others from accessing it. Items stored in a repository remain accessible no matter where a contributor relocates.

3. Programs to influence action will be more effective if they are based on an understanding of the target audience's own perceptions of the proposed exchange. Before beginning any marketing or diffusion activities, you should determine how people outside the project perceive the repository. Surveying (either formally or informally) members of your stakeholder group or other potential users will help you gather this information. For example, you could test versions of marketing messages with small groups, obtain feedback and redesign or refine them to make them more effective before distributing them widely. Once you ascertain users' attitudes about the project (or determine if they are even aware of it), you will better be able to craft your messages and materials to address specific issues or misconceptions. If, for example, respondents think the repository may be difficult to use or learning how to use it may be too time-consuming, you might emphasize the user friendly aspects of the software or the availability of training. Focusing on the desirable aspects of the repository and the benefits of adoption encourages favorable attitudes.

4. Target audiences are seldom uniform in their perceptions and/or likely responses to marketing efforts and so should be partitioned into segments. Early in your the planning, you identified stakeholders—individuals or groups that would benefit from and use the repository. While all are potential repository users, you must remember that they will bring diverse needs to the project and have different expectations of the benefits to be received. Therefore in your marketing or training messages, you should identify segments of sub-audiences within the stakeholder group. You can then target each sub-audience with specific messages about how the repository will benefit them in particular. Messages about how repository use saves institutions money by eliminating the creation of duplicate learning objects by faculty members or by providing an easy way to document and share administrative resources within an institution appeals to administrators. This same group will learn to value repository use through messages about how teaching and learning improve when faculty have free access to high quality learning objects. Faculty, on the other hand, will respond to messages about how repository use saves time in lesson planning/preparation or how freely available repository materials help illustrate difficult concepts to students.

Once your various audiences are identified and messages crafted that will appeal to their specific needs, your next step is to plan your marketing delivery. You should consider models of **communication flow** and choose the most effective ways to deploy your messages. Rogers recommends the **two-step flow model**. He asserts that mass media does not have a direct impact on individuals. Rather marketing influences people's actions more effectively when media messages are directed to opinion leaders who

then pass the information along to their followers. In the two-step flow model, value is added to the message because it is received from a person respected by the individual receiving the message, rather than simply from a faceless media entity. Interpersonal interaction is critical in facilitating this type of diffusion. By identifying and marketing to opinion leaders in the various sectors you are trying to reach, you will spread your message more efficiently.

5. Recommended behaviors always have competition which must be understood and addressed. Competition is an interesting concept. While your project may not have a direct competitor in the form of another repository, you still face competition for the user's attention from other ideas or ways of doing things. For instance, faculty may usually rely on course packets from publishers for their instructional content. Any established method of doing things can be a type of competition for your innovation. Training is an effective method for overcoming some of these issues. A well-crafted training session can illustrate the many benefits of a repository and convince possible holdouts to adopt a new way of doing something. Training is discussed in more detail in the next section. Also consider what your organization does or can do well. What do you offer that is different from your competitors? What advantages do you have over other groups engaged in similar efforts?

6. The marketplace is constantly changing; program effects must be regularly monitored and management must be prepared to rapidly alter strategies and tactics. Throughout your diffusion and marketing efforts, you must continually perform **formative evaluation**. This is research conducted while an activity is ongoing in order to improve its effectiveness. Feedback from your users and stakeholders ensures that you have a product that is meeting the needs of your intended audience. Conducting formative evaluation throughout planning and marketing as well as during pilot implementation of your repository enables you to identify problems with the implementation or any aspects of the project that displeases users. If users see that you are interested in their opinions and are incorporating their feedback, they are more likely to stick with your project through any rough patches.

7. Marketing efforts must incorporate all of the "4 Ps", product, price, places, promote. The first two "Ps", *product* and *price*, were addressed during the planning stages of your project. You then assessed your stakeholders' needs and desires and planned a repository that would offer them the features and benefits they desired. Your planning teams also considered the "price" of the repository, both in the cost of development and in any costs passed along to the users.

Places refers to your repository's availability to your users and the ease in which they may discover and access materials. Again, The Orange Grove's strategy of integration with an institution's LMS was effective here. Placing the repository within a system the faculty is comfortable accessing, encourages use of the repository.

The 4th "P", *promotion,* incorporates all of the marketing strategies through communication efforts. There are several possible avenues you can use to promote your repository. If your budget permits, you may use paid advertising, such as Internet advertising and print media. Public relations, a form of unpaid advertising, might include newsletters, targeted emails, websites, press releases, sponsorships, and a presence or presentations at conferences, seminars and exhibitions. As we discussed earlier, word of mouth, especially when delivered through opinion leaders, is a valuable promotion strategy that promotes attitude change. You might also consider providing incentives for early adoption of the repository, at least until the critical mass is reached. You could, for example, offer those users that contribute resources to the repository a small promotional item or a letter of commendation for their personal files.

Example Strategies
Spreading the word about your project and persuading people to begin using your repository takes a combination of diffusion and marketing initiatives. Below are some ideas and examples of approaches taken by The Orange Grove , Maricopa Learning Exchange, and North Carolina.

The Orange Grove
As The Orange Grove was beginning to expand its scope, the strategic planning committee met and formed several ideas for marketing the repository. We have already described the strategy of identifying a "champion" at the various state institutions; other marketing ideas developed by the project's leadership are discussed below.

Originally, the project planned to contract with a firm/individual who would consult with us and prepare a statewide awareness campaign that would include the following:

1) information to be provided to Consortium members for distribution at their institutions
2) videos and flyers identifying the benefits of the repository
3) presentations and booths at statewide educator conferences
4) give-away awareness materials
5) faculty use testimonials

Although no funds were ultimately available for contracting for marketing services or give-away materials, the project still was able to produce an informational video (available at http://www.theorangegrove.org/) by re-purposing the LOLA Exchange animation (http://www.lolaexchange.org/#). Kentucky was then able to re-purpose The Orange Grove's version of the video—making only minor modifications to fit the context for their repository—The Kentucky Learning Depot (http://apps.cpe.ky.gov/depot/multimedia/about.asp).

Another effort by the project staff was to see that the repository was mentioned in publications targeted toward potential users. An article about The Orange Grove appeared in a statewide newsletter sent to every K12 teacher in the state of Florida. Because of the article in the newsletter, created by a teacher in residence, a major request for accounts was made to The Orange Grove.

Project staff members even now continue to make presentations and conduct workshops at national, regional, and statewide conferences, as well as at workshops and presentations at statewide meetings and individual institutions. Both the Project Director and Executive Director of the Consortium regularly attend state, regional, and national conferences related to technology, education and training, and distance learning. By networking at these events, the directors have discovered new potential partners and resources. The current communication plan from The Orange Grove includes a continuation of these efforts. FIPSE project funds continue to provide opportunities for conference travel and repository-related presentations by the FIPSE project coordinator.

The Maricopa Learning Exchange
Maricopa Community Colleges created a "road show" that was a very effective marketing tool. Primarily created to educate the system's faculty about reusable learning objects, it also benefited the system's repository, the Maricopa Learning Exchange.

Two faculty members who were assigned to the project for two years developed the road show. They were compensated for their efforts through release time. Each was given the equivalent of one course per semester as paid time to devote to the project.

The road show had three main goals:

1) to create awareness about learning objects,
2) to show faculty how to find and incorporate learning objects into instruction, and
3) to teach faculty how to create and share their own learning objects.

The road show visited each of the ten campuses in the Maricopa County Community College District and conducted learning workshops focusing on each of the three goals. The instructors conducted the workshops to engage in person with users, hear their concerns, and provide and receive immediate feedback. They considered conducting regional workshops but decided against this strategy because it created difficulties for faculty having travel to another campus. They felt that turnout would be higher when workshops were locally hosted.

The events were publicized beforehand. First the organizers contacted individuals at each campus, including staff at centers of teaching and learning and faculty developers. Next these staff members and developers asked their contacts to help spread the word. The Maricopa team discovered that emails coming from people on the home campus who are known to the faculty were more likely to be read than those sent from unknown entities. The Maricopa team also placed general announcements in faculty publications.

Another effective technique for generating interest in the workshops was to have the events count as professional growth for the faculty. Approved professional growth activities are accumulated and applied toward increases in pay, an additional incentive for faculty to participate.

NCLOR

Prior to implementation, the North Carolina Community College System used regional meetings and other events to create excitement about the project and raise its profile. They sponsored a Symposium on “The ABC’s of Learning Objects,” a day-long event that provided faculty participants with information about learning objects and the benefits of a learning object repository. Multiple faculty subject matter experts and developers demonstrated their learning objects and discussed how the using objects had benefitted their students. The developers answered detailed follow up questions from the audience. Also food was served at the event and door prizes given to workshop participants in the afternoon.

Participants gained knowledge of the project and became repository proponents at their home institution. View handouts from the event here:
http://preview.oncoreblueprint.org/_doc/ChangeMgt/NCCCSymposium.pdf

Training

Training sessions are also a valuable tool in change management. Potential users are often reluctant to use a new technology because they don't how it works and don't have the time to figure it out on their own. A brief training session or online tutorials goes a long way toward solving these problems. Users are more likely to embrace the repository once they see it in action and learn how they can make use of its materials to enhance their teaching.

Some projects or institutions offer training to communities of potential users from a specific discipline. The faculty from that discipline are then able to discuss strategies for incorporating digital resources into teaching in their area. Others train instructors from a cross-section of disciplines. Another strategy is to emphasize teaching effectiveness, rather than focusing on technology as the training topic. Some repositories create institutes or programs inviting faculty to identify and work on projects related to authentic questions arising from their teaching experiences. Users value online tools and resources that they know have actually resolved teaching and learning issues. Training can also build a community that encourages collaboration and sharing. To learn more about training as community building, visit: http://www.irrodl.org/index.php/irrodl/article/view/299/653

During the training activities, people learn about the repository. Thus training also serves an important marketing function, To create successful training, you must make it accessible to as many people as possible. Below are different ways to deliver the training:

- face-to-face sessions
- live on-line sessions
- recorded on-line tutorials that users can access anytime.

As you plan your training activities, consider how to maximize your resources, as well as the most effective way of reaching your target audience. A combination of training strategies may be most effective. Online discussion forums and email enable asynchronous interactions. You can also set up synchronous interactions via telephone or video conferences, or via audio graphic conferencing tools such as *Elluminate* or *Wimba* Face-to-face events, such as conferences and institutional meetings, gather community members together.

The Orange Grove has held both online and instructor-led training to demonstrate how easily learning resources can be used in everyday instruction. Face-to-face training has been arranged for existing opportunities (e.g., in-service, meetings, conferences) to illustrate to faculty that The Orange Grove is easily accessible and has a wide range of instructional materials that promote effective student learning and engagement. Training has been conducted by The Orange Grove staff, as well as by stakeholder institutions. Each institution supports the training effort by sponsoring and leading local training sessions based on materials developed by the repository project.

The training sessions enable communication between the stakeholders and users. Because of the training sessions, more and more Florida's educators use the repository and are more aware of teaching strategies that improve student learning. Faculty presentations at the training sessions—faculty talking to faculty about how they use a learning resource and its impact on their students—are especially successful. Orange Grove training participants are highly interested and enthusiastic about how other instructors have created and/or implemented digital content in their teaching. We suggest that you reserve time for debriefing of each session to discover ways to improve training, as well as to provide users and stakeholders an opportunity to share problems and potential solutions.

In May, 2008, SREB consultants presented training that Florida re-focused to be delivered to its educators in the fall of 2008. The training was delivered at each institution by staff that were recognized and accepted by faculty. Some portions of this training are also being developed for storage and delivery online.

The Orange Grove staff also offers training via online conferencing tools. The Florida Distance Learning Consortium has a license for 65 concurrent seats for Elluminate. This software creates a real-time training, demonstration, and collaboration environment through dial-up modem or high-speed LAN. It enables the delivery of live, video-capable, online learning, training, coaching, mentoring, and meetings. Participants can speak over the Internet through 2-way audio, chat online, and share whiteboards and applications. Elluminate provides an excellent option for conducting live training sessions without the added cost of travel and the need to find training facilities to accommodate the group. Sessions can be archived and edited to become accessible at any time.

Finally, The Orange Grove staff has also developed online training materials, which allow users with moderate technical skills to learn to use the repository without traveling to a training class or requiring a trainer to be present. These tutorials are stored in The Orange Grove and can be accessed from the repository web site: http://www.theorangegrove.org/tutorials.asp.

Communication

Every project of this magnitude is dependent upon consistent, structured communication to deliver and receive critical information. To facilitate your project's success, you need effective communication processes in place to disseminate information and receive feedback from users, participants, and other project stakeholders. A solid communication plan has guidelines and a beginning point to expand upon as implementation progresses. As the project unfolds, you will probably identify additional areas of communication and develop new elements for your communication plan..

In developing our communication plan, The Orange Grove had several key objectives:

- Identify audiences for project communication by sector.
- Identify the communication/organizational structure of the project.
- Identify each audience's communication needs.
- Plan for communication content and channels that will result in desired behaviors.
- Define roles and responsibilities for funding, preparation, and dissemination of the various project communications.
- Provide a means for feedback and improvement for project communication.

We also identified a number of communication tools to use to disseminate information:

- **Newsletters, targeted emails, and websites.** Consortium and project staff members use newsletters, emails, and websites to disseminate information about the repository. Information and problem reporting structures on consortium and repository websites gather input from users.

- **Marketing materials**. We planned a variety of marketing materials to promote repository recognition and to facilitate its access by users. As your project is funded, you will need to specify the materials you wish to create in your marketing plans.

- **Presentations**. Currently, Florida's Repository Project Director and Executive Director of the Consortium make presentations statewide and regionally. These events are not only opportunities to spread information, but also to receive input from attendees. The feedback helps us refine communication plans and improve future presentations.

  Currently, we are planning presentations to key Department of Education contacts and will solicit their suggestions for additional stakeholder events to learn about user needs as well as to disseminate information about the repository project.

Evaluation

Ideally, you evaluate throughout each phase of building a repository. We recommended that you conduct a needs assessment during the early planning phases of your project. You should have used that output during all of the subsequent planning activities.

During the *Operational Planning & Details* phase, your evaluation activities will support how the repository is implemented. You can use the data gathered to ensure that as the repository is being built, you are continuing to meet institutional and statewide goals; you can also use the data to report progress or challenges. You will find the Evaluation Worksheet useful in this phase because it helps map evaluation activities from large project goals through data collection and analysis.

Sometimes the most difficult part of conducting evaluations is effectively communicating how the results have helped support informed decisions. Many stakeholders are interested in the implementation of a repository will also have an interest in the opportunity to collect data and to review results. As you prepare reports on evaluation activities, know the limits of your data and make sure that the questions asked directly address the issue you are investigating (e.g., the results from a faculty survey on readiness to use classroom technology should not be used to decide how to allocate funds for library technology). You should also be sure to report data at the appropriate level (e.g., in a report to the provost do not include ten pages of faculty comments on their attitudes about technology).

Finally, as you plan your evaluation activities, consult your institution's IRB or research compliance office to ensure you follow the appropriate guidelines. Your institution's social sciences department can be a rich resource for assistance in planning and conducting evaluations.

Resources

- Evaluation Worksheet (coming soon)
- Surveys: http://en.wikipedia.org/wiki/Statistical_survey
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- Vogt, Paul W. (1998). Dictionary *of Statistics and Methodology: A Non-Technical Guide.* (Second edition.) Thousand Oaks, Sage Publications.
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Project Implementation Timeline

Once you have completed the operational planning tasks necessary for your repository project, you are ready to develop a project schedule and timeline. Assign staff members to each task and estimate how long it will take them to complete each task. Having a master schedule of all the components of the project will allow the project manager to monitor progress and keep the project moving forward.

We have included a worksheet to assist in developing a project schedule. We have also provided an early project plan from The Orange Grove as an example. While this plan was altered and changed quite a bit along the way, it illustrates the myriad things you must consider when planning your repository.

Resources

Project Timeline worksheet (See Appendix 11)
Orange Grove Work Plan (See Appendix 12)

Budget

Draft a 3-year budget based on defined needs and funding models.
Given your expected funding sources, consider the scale of your initial implementation. During the planning phase, you envisioned what was needed to create an "ideal" repository. Now as you approach the implementation phase, you may have to revise some of those ideas to fit your timeline and budget.

Using the work done by the Leadership and Strategic Planning Partners, you should have a clear idea of the repository's structure and needs. As you create a budget, review all of the planning you have done up to this point, and include items that *must* be funded. The Operational Planning Teams will have provided enough information to put together a rough draft of a project budget.

As you draft the budget, consider the following:

1. **Software**
   Based on your software team's research, your project staff should now have chosen the software to be used for the repository and will have a rough idea of its cost. If you have submitted a formal RFP, then you should have also clearly identified guidelines for making the final selection from the submitted proposals.

2. **Network Requirements**
   Using the information gathered by the Technology Planning Team, develop a technology budget, including servers and other equipment needed to house and run the repository. Also consider costs to acquire necessary bandwidth to support the planned number of users for the types of media to be housed.

3. **Staff**
   As you budget for staff, include salaries and benefits for all full-time employees of the project. You might wish to research salaries offered for comparable positions in your state as well as in other repositories. Conducting similar research on contractors may also be helpful.

   If you are sharing staff with another project or organization, clarify the portion of the employee's salary that your project will be responsible for and the amount of the employee's time your project will receive or if the employee's time is to considered an in-kind contribution to the project.

4. **Marketing**
   The amount of funding needed for marketing will vary based on your marketing strategies. If you plan to use a professional public relations firm, you will need to budget for its services. You will also need funds for printed materials, advertising, promotional items, and other similar marketing tools.

5. **Training**
   Successful training is critical to your repository. Generally, users will not benefit from the repository until they are confident in their ability to locate and contribute learning objects. The Orange Grove continues to conduct or host regional training sessions throughout the state and to produce online training materials. You must include these kinds of ongoing efforts in your budget.

6. **Travel**
   For a successful implementation of the repository, the staff needs funds to travel as part of an ongoing coordination, training, awareness, and marketing effort. Meeting with contracted individuals and teams in person to coordinate the discovery and development of learning materials is critical to the project's success, as is attending workshops and conferences.

7. **Expansion & Maintenance**
   Depending on available funding sources, you may need to charge users/institutions for at least

some of your repository services. As you add users, you will need additional licenses, bandwidth, and storage. You could charge your statewide member institutions a fee or have them make in-kind contributions. You might wish to consider a tiered system in which some services are free of charge, while others are made available only to financial contributors (i.e. a regular vs. premium services arrangement). You can also generate a small amount of income by hosting other groups or states on an interim basis as they gear up for full implementation of their repositories. For example, The Orange Grove has hosted the SREB-SCORE, University System of Georgia, and Kentucky Learning Depot projects.

PHASE II: IMPLEMENTATION

For starting your repository, we recommend a “scaled” implementation. You begin with a handful of users to test the entire system; your implementation will test users interacting with the software, the repository structure, and policies and procedures. From scaled implementation you will move to a pilot implementation with a larger group, perhaps an entire institution or a group of early adopters. Finally, you will add the remaining users or institutions for full implementation of the entire system. Using this approach, you test the hardware and software configuration and functionality on a small scale and can identify and resolve problems in a manageable environment. It is critical that the system function properly as users begin to explore the repository. New users who have a positive experience will relate their satisfaction to other faculty and colleagues. If users encounter difficulties, their experiences may negatively influence repository use and adoption by others.

As you plan your implementation strategy, consider these additional points:

1. Are you offering the repository as a stand alone tool?
2. Are you integrating the repository into a single learning management system or multiple learning management systems?
3. Are you providing both options of stand alone and integration to your institutions or departments?

To ensure success at any scale of implementation, you should also address these tasks:

1. Project Staffing
2. System Set-up
3. Support Systems
4. Content
5. Training
6. Marketing

Deploy Operational Plans

During the planning process, you developed the policies, procedures, and other infrastructure needed prior to the launch of your repository. Review your plans and see if any adjustments need to be made based on current conditions. Be sure to cover

- hiring staff,
- setting up your hardware and software systems,
- putting your support services in place, and
- loading content into the repository.

Each of these areas will be discussed in more detail in this section.

Staffing

Although technology is central to your project, it is your staff that will ensure its success. We suggest you review the staffing plan created during the planning phase.

Funding greatly impacts your desired level of staffing. As you identify new team members, remember you can hire staff as full- or part-time employees or as consultants, or you can reassign some duties to your existing team. To hire new staff, advertise previously prepared job descriptions, interview candidates, and select the most qualified candidates. Use your professional networks to inform others of the open position. If you are hiring consultants, begin your selection, and write contracts describing the deliverables. If you plan to share or "borrow" staff members from stakeholder groups, finalize these arrangements. For reassigned or borrowed staff members working on several different projects, establish a schedule that clearly outlines the amount of time that should be spent on each project and related duties. We suggest that you pay particular attention to the need for documentation as a deliverable. Particularly when personnel perform technical tasks, they need to provide sufficient documentation to allow a "new" person to update or revise the function at a future date.

Assemble your project team as completely as possible before implementing the repository. If you are unable to fully staff your repository project for any reason (e.g., budget issues, lack of suitable candidates), readjust your staffing plan. You must articulate how critical suitable staffing needs are for success. In Florida and Georgia, initial staffing has been accomplished by one or two individuals with assistance from institutional staff or OPS workers from higher education because of limited budgets. While not ideal, these states have moved forward and launched their repositories.

System Set-up

At this phase of your repository project, you should have selected software, chosen open source or a vendor product, and made fundamental decisions concerning hosting the software for your system or contracting for a hosted environment with a vendor. Many different ways are possible. In North Carolina, the North Carolina Community College System contracted with the state's Office of Information Technology Services (http://www.its.state.nc.us/Default.asp) to host their repository, saving substantial costs. In Florida, the Florida Distance Learning Consortium purchased the servers and contracted for hosting with the College Center for Library Automation (CCLA), (http://www.cclaflorida.org). CCLA manages the community college library system and was able to offer 24 x 7 x 365 technical support for the hardware system at a reasonable cost. The Kentucky Postsecondary Commission contracted with another state to host their pilot implementation for two years.

If you are hosting the software on your own servers, the vendor, in cooperation with your system administrator, will probably have recommended the server configuration and the operating systems. Based on those decisions and an analysis of anticipated users and use, you should have already selected and ordered repository hardware and software and had your selected system administrators load it for configuration and testing.

Before opening the repository, you may wish to make some basic customizations for startup. The decisions made during the planning phase will guide the way you set up the software. Be sure to consult each of the relevant workgroups' decisions. For example, the system needs to be set-up to accommodate your chosen metadata schema and to facilitate your workflow process.

Here are some customization questions to consider.

1. Are you applying a logo to the repository?
2. What information should appear on the front page?
3. How do you access the repository and from where?
    a. Will there be integration from within one or many learning management system(s) (LMS)?
    b. Will users login separately?
4. How will Stand Alone User Accounts (when not integrating the repository into the LMS) be set up? Which of the following user name protocols will you use?
    a. Last name_first name
    b. First initial_last name
    c. E-mail address
5. Will there be a guest account access?
6. Will you be using any virtual workflows within the repository software to accomplish quality reviews?
    a. If so, is there a need to create multiple or branching workflows?
    b. Does the software support the level of workflows you need?
7. What about metadata?
    a. Based on your planning, are there specific metadata fields to be setup?
    b. Are you incorporating "controlled vocabularies" into the metadata collection system? If so, how those will be added to the system and who will do the work.
8. How will your content be organized?
    a. Will you create one large collection of content or will there be multiple collections? If there are multiple collections, how will these organized, made visible, and accessed?
    b. Will there be any content that is restricted to your state, or other groups, due to licensing?
    c. What parameters/policies govern the creation of collections? For example, are defined groups allowed to have their own collections?

Remember, that based on your product assessment during the software selection process, you should have a basic idea of how the software will function and what customizations are required. The answers to the customization questions above will impact configuration of the repository. All of which must clearly be communicated to whomever sets up the repository software.

Plan downtime for upgrades and possible repairs. Establish regular downtimes and specify how you will notify and communicate with your administrators and users about downtimes. Having a monthly scheduled time when the repository is offline allows support staff to schedule maintenance, upgrades, or troubleshoot with minimal disruption to your users. You should clearly specify how will let users and administrators know when there is no need for regularly scheduled maintenance.

Support Services

Review the plans made for providing user support and update them as needed. You may have new opportunities to leverage current support systems and structures or new support cost-sharing options. If you are doing a scaled implementation, decide which support options you will offer during the pilot phase, and discuss how you might expand support for the next phase as your user load increases. If the repository software offers a help function, decide if you need to market it to your users. Implement the selected support structure for the test and/or pilot phases.

Content Collection

In order to properly test the repository system functionality, you will need a sufficient collection of digital materials. Adequate content gives users a reason to access the repository. One approach is to have enough materials to support one or more complete courses in a selected discipline. Ideally for this approach, you should select a high enrollment course, or one with difficult concepts that allows students to particularly benefit from the use of interactive digital content. At minimum, we recommend that at least 10-15 items be contributed to the repository in at least two subject areas (e.g., algebra and biology) for your test implementation. The more content you have available for your pilot implementation, the better. If initial users' first impression is that the repository has few resources or lacks resources in their discipline, they are not likely to continue to use it. If you are concentrating on a limited number of subject areas or targeting specific audiences initially, or for the life of the repository, make that very clear to users. When you expand your offerings, you will have an opportunity to market your new resources to specific audiences.

Depending on decisions made earlier, your staff may be inputting content consisting of individual files, content packages or aggregations, or URLs. During the planning process, you probably identified what existing content that you planned to include. When looking for vetted content sources, we suggest you first identify content funded or licensed by your state, or developed with federal government funds such as grants from the National Science Foundation or National Institute of Health. You may possibly add existing collections of learning objects or digital assets at state libraries and institutions to your repository. Members of your stakeholder group may also have content that might be housed in your repository. Owners or managers of these materials might be willing to include the items in the repository at no cost with or without restricting access to different types of repository users. Please note that often there is a grant requirement that content must be disseminated at no cost.

Depending on your software system, you may be able to batch load or import existing items into the repository. This saves both time and labor when populating the repository. If the imported items already have attached metadata, make sure the metadata is imported into the repository as well. Even with batch importing, it may be necessary to edit or adjust the content or metadata after import. If your software does not support batch uploading, or if the content is scattered among a variety of sources, you will have to add the items or objects individually. Again, be sure to add the metadata, according to your chosen metadata structure, to ensure future ease of access. The effort you expend now will add value to your repository as it grows in size and complexity.

Federation with, and harvesting of, other standards based repositories can provide thousands of resources. Harvesting involves using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) (http://www.openarchives.org/pmh), a low-barrier mechanism that allows repository to easily interact with one another. When repositories use OAI-PMH for their metadata, the metadata can then easily be used by other repositories or service providers. This page lists registered OAI conforming repositories: http://www.openarchives.org/Register/BrowseSites .

At this time, the OnCoRe project team has not located a website that maintains a similar listing of repositories or collections that enable federation. However, as a starting point, The Orange Grove currently federates with these in-state and out-of-state collections:

- **BC Campus SOL*R** – access to BCcampus online learning resources from a variety of disciplines and subject areas. As of October, 2008, the majority of these resources were available **only** to the BCcampus community. A search on "AGLO" (**A**pplied **G**eophysics **L**earning **O**bjects) yields around 25 accessible results; a "Design" search returns over 100 open content resources related to course design, learning object design, and website design. For more information see: http://solr.bccampus.ca/cms2/

- **Intute Repository** – access to vetted, open-access web resources for education and research across universities in the United Kingdom. For more information see: http://www.intute.ac.uk/irs/

- **MERLOT** – access to peer reviewed, higher education online learning materials catalogued by registered members and a set of faculty development support services. **This repository houses URLs rather than actual resource files**. Discipline areas include Arts, Business, Education, Humanities, Mathematics and Statistics, Science and Technology, and Social Sciences. For more information see: http://www.merlot.org/merlot/index.htm

- **USG Share** – the University System of Georgia learning object repository houses resources from a number of higher education disciplines. As of October 2008, about 60 items were available to users outside the USG system, including about 20 Nursing resources. http://usgshare.org/

- **Library of Congress –** most items are library records describing the resource, rather than a link to an actual digital resource. Those items that have URLs associated with them appear in the search results. http://www.loc.gov/index.html

- **Florida on Florida Collection of the Florida Electronic Library** - access to digital resources about Florida history, culture, and environment. Includes digital collections held by libraries, archives, museums and historical societies throughout Florida. For more information see: http://bibt10f-8.fcla.edu/cgi/b/bib/bib-idx

- **PALMM (Publication of Archival, Library & Museum Materials) –** access to source materials for research and scholarship relevant to the students, research community and general citizenry of Florida. For more information see: http://palmm.fcla.edu/

Another source of content is individual faculty. Administrators of The Orange Grove, as well as of many of the other repositories we interviewed indicated that soliciting content from faculty was a challenge. Often faculty must first become aware of your repository and be at ease using it before they are willing to contribute their own items. We will address ways to reach out to faculty in the marketing and training section of Phase II.

Test Implementation

Before the pilot implementation goes live, conduct a **test implementation** that includes all the content and functionality that you plan to feature in the pilot. Ask a small group of core supporters to evaluate the repository functionality on a list of specific functions such as performing a search, uploading content items, or other common tasks that repository users will perform.

You should also test your support or help services and your feedback form at this time. Confirm that support and help services are available and prepared to assist your users with any questions or problems. Review the repository interface to ensure that contact information for support or help services is readily available. Users *must* have a positive experience in their initial interactions with the repository. A difficult first impression can drastically slow the progress of repository use. Ask your testers for feedback and suggestions to identify basic problems and essential improvements. Test the feedback form. You may receive conflicting feedback and recommendations from your users. Your project staff or other designated group will need to decide which improvements should be made prior to the Pilot Implementation launch. Using the recommended changes, feedback, and questions received begin assembling an online FAQ to be a knowledge base.

Pilot Implementation

Once the test implementation feedback has been evaluated and selected changes have been made to the repository, it is time to launch the pilot implementation to the group identified during planning. The pilot group can vary significantly in size. It could range from one department to an entire institution or multiple institutions. Ideally, your pilot launch should be introduced by individuals with prestige in the educational community.

The length of the pilot implementation may vary. It could be just long enough to work out the bugs or problems in the system before you move to full implementation. Or, the pilot phase can last for an extended period of time as you wait for funding or plan for expansion. The length of the pilot implementation must be clearly communicated to the pilot users or stated on the website with a user feedback form.

Confirm that your support and help services the updates based on user feedback from the test implementation are completed and that help staff are ready to assist your users with any problems.

Update Planning Phase Outputs

Please review your earlier plans for implementation, and make changes as needed.

In the earlier planning sections, we discussed a number of strategies for publicizing your repository and encouraging use within your stakeholder group and other target communities. Now that you're ready to launch the pilot, revisit and refine your plans. In addition, you may want to consider some further strategies to take advantage of the fact that your repository is now up and running. This section covers additional ideas and strategies for the following:

- diffusing your innovation
- expanding content
- marketing, and training

Diffusion Strategies

The goal of any diffusion strategy is to spread the word about your innovation and encourage users to adopt it. In the case of The Orange Grove, the targeted users are tenured and adjunct faculty. During the Blueprint's planning phase, we presented a number of approaches to inform faculty about the repository. These strategies may also be modified and used to target any other user groups that your repository wishes to recruit.

As your implementation plans are finalized, you may want to refine your diffusion strategy. In spreading the adoption of a new technology, there is no one correct approach. Your approach should be based on the culture of the organizations involved. You will probably need to approach challenges in multiple ways to achieve your goal. In this section we discuss some examples of strategies used by various repositories to locate and educate potential repository users while encouraging adoption. These include the following:

- Adopting a program similar to The Orange Grove Scholar/Advisor Program
- Fostering communication and collaboration among users
- Promoting your repository for publication and scholarship
- Offering opportunities for community service

1. The Orange Grove Scholar/Advisor Program The Orange Grove is currently exploring the effects of both a top-down and a bottom-up approach. We hope that having information about The Orange Grove emanating from multiple sources and points of view will lead to greater and more rapid diffusion of the innovation. Members of The Orange Grove staff and committees and Florida Distance Learning Consortium (FDLC) continue to seek support from statewide leaders, legislators, and other influential groups and individuals who may affect use of The Orange Grove. More recently, we have contracted with a group of faculty members to work as "Orange Grove Scholar/Advisors."

The Orange Grove Scholars are nominated by FDLC members or The Orange Grove institutional liaison for their leadership capabilities and their interest in digital content. At their individual university and college campuses around the state, these faculty members reach out to other faculty members and departments. A list of potential tasks is provided to the nominees. The faculty members and The Orange Grove staff review the tasks and agree on all or some of tasks to form the basis of the contractual agreement and payment for the faculty member's services. Each faculty member serves at least a two-semester commitment.

Supported by FIPSE funds, The Orange Grove Scholar/Advisor program explores techniques for increasing repository use. Scholar/Advisors serve as the information conduit to department chairs, deans, vice-presidents, and presidents. They demonstrate, teach, and request contributions of content from their fellow faculty members. The Orange Grove Scholar has added credibility and interest in our repository at the campus level, critical to expanding educators' use of repository materials in their classes. The Orange Grove Scholars have indicated that it is extremely beneficial to have two individuals working together to share ideas and put on events. This appears to be particularly important in the early stages of adoption of the repository.

The Scholar/Advisor program began in the fall of 2008 with a single institution. We identified two faculty members at Florida Gulf Coast University and offered them a small stipend in exchange for acting as campus "champions" to promote usage of The Orange Grove. After the first semester, we expanded the program to include seven more advisors at four additional institutions (two advisors each at Seminole Community College, St. Petersburg Community College, and Manatee Community College, and one advisor at the University of West Florida). This expanded effort is currently ongoing, and evaluation results for this initiative will be included in future versions of the Blueprint.

The two-phase approach was helpful—the advisors from Florida Gulf Coast University offered insights and suggestions to the new advisors. As part of their strategy, the Florida Gulf Coast University advisors created a blog to record their experiences (http://orangegroveblog.wordpress.com/). The blog now serves

to facilitate communication among the expanded group of Scholar/Advisors as well as several other functions. It provides an easy way for Orange Grove staff members to disseminate information to the Scholar/Advisors. We have posted orientation materials, PowerPoint presentations, graphics and logos, and other resources. The Scholar/Advisors are able to access and download this information as needed. The blog also allows the Scholar/Advisors to communicate with one another, share ideas, successes, and challenges. It was especially useful to the new advisors as they were starting out, providing them a resource to review and learn from the experiences of the Florida Gulf Coast University advisors.

2. Foster communication and collaboration among users. Providing your users a sense of community and a chance to engage with their colleagues encourages repository use. In his article "From repositories supported by communities to communities supported by repositories: Issues and lessons learned," Tom Carey describes several innovative approaches used by MERLOT to facilitate repository use (http://www.ascilite.org.au/conferences/singapore07/procs/carey.pdf). One is to develop "communities of purpose"—groups within the repository that focus on a particular interest or passion. This allows faculty from different institutions to interact and collaborate with others whose interests align with their own. Also, MERLOT materials can be accessed via community portals, offering a single point of entry to a variety of resources that pertain to a particular discipline. The communities of purpose also function as editorial boards for the discipline portals, assisting with organization and management of resources.

Another strategy employed by MERLOT is the Elixr program (http://elixr.merlot.org/about/). The goal of this initiative is to "develop and test new collaborations amongst faculty development centers and online resource repositories." The goal of this initiative is to create "innovative models for the development, sharing and use of discipline-oriented resources which illustrate exemplary teaching practices and which also support faculty with exemplary learning objects to help implement those practices with their students." By organizing faculty into subject area groups, the members are can observe how a particular resource is used and performs in their own discipline.

3. Promote your repository for publication and scholarship. As part of their promotion and tenure requirements, university faculty must provide evidence of scholarly publications. Generally, faculty submit books or articles to peer-reviewed journals.

Increasingly, some faculty are publishing outside the traditional model. Clifford Lynch, in a 2003 article, "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age," (http://www.arl.org/resources/pubs/br/br226/br226ir.shtml), speaks about new, freely accessible digital disciplinary collections that are changing the way scholarly information is accessed and disseminated. The repository can guarantee preservation of these works. Lynch foresees that both faculty and student work might be housed in repositories, as well as documentation of performance events and other intellectual activities that provide a record of the "ongoing intellectual life of the institution." While some universities, such as the Massachusetts Institute of Technology, have pioneered efforts to develop this approach to publishing, other universities have been slower to adopt this model. The Orange Grove project director has consistently promoted the potential value of recognizing both digital publishing and creation of digital learning materials as scholarly efforts at individual institutions. For another article on nontraditional publication, see "Reforming Scholarly Publishing in the Sciences: A Librarian Perspective," (http://www.ams.org/notices/199804/branin.pdf) .

4. Offer opportunities for community service. A repository can also provide an opportunity for faculty to complete hours of community service that can be documented for tenure and/or promotion review. You might explore how your repository could assist faculty in accruing these hours. Faculty who review materials and vet resources in their subject area could document those efforts toward their service requirement.

The Orange Grove Digital Repository recruited approximately 35 faculty members statewide to metatag licensed resources from the National Repository of Online Courses (NROC). We believed that additional metadata, including the addition of Statewide Course Numbers, would make these materials more accessible. Faculty members in identified subject areas such as mathematics, chemistry, biology, history,

etc. were nominated and signed up to be “reviewers”. They were asked to enter specific metadata fields, including

- the relevant course numbers (based on Florida’s Statewide Course Numbering System) that these resources might support,
- additional keywords,
- grade/age levels,
- estimated learner completion time, and
- any additional descriptive information that might prove useful.

The Orange Grove provided each reviewer with a $20 gift certificate to Border’s Bookstore and a letter of recognition/appreciation for their service. In the future, we plan to collect the names and addresses of each reviewer’s academic dean or vice president and send a copy of the letter to them. (link to letter)

Another possibility for faculty service is to identify subject matter experts (SMEs) for the repository on an ongoing basis. Many repositories have editorial boards—SMEs—that review the content in the repository for accuracy, quality of design, and pedagogy. The Intute repository in the United Kingdom offers a database of web resources vetted by SMEs in each particular subject area. The Intute administration is a consortium of seven universities and partners from across the U.K., (http://www.intute.ac.uk/about.html). The group’s list of partners (http://www.intute.ac.uk/partners.html) is extensive and ensures Intute has can find an expert to review content in any subject. As resources are suggested for the repository, a SME in the relevant area is assigned to review the material and make certain that it is up to established repository standards. (more on Intute: http://www.innovateonline.info/index.php?view=article&id=398&action=article)

As you consider these options, remember that generally each institution decides what types of publication and service count toward promotion and tenure. Having policies related to your repository adopted can be very challenging. You will need to work with your contacts in key leadership positions at the various institutions to move such initiatives forward.

Content Expansion

During the Pilot Implementation phase, you should continue to seek out new sources of content for your repository. Once your repository is operational, you may have new opportunities or avenues from which to solicit content .Users are always searching for new items to use in their teaching. A measure of repository success is to have users contribute content. Generally new users begin by searching for and using available content; encourage them to eventually create their own items and place copies in your repository. You can also suggest that they submit URLs and high quality content that they are using for their courses. You should continue to explore other opportunities for harvesting or federation with other repositories (These issues were discussed earlier in the operational planning section.) In this section, we will discuss multiple content sources and strategies for acquiring content including the following:

- Open Textbooks
- Faculty/Institution Developed or Produced Content
- State Developed, Licensed, or Grant Funded Content
- Federal Grant Products

1. Open Textbooks. Open textbooks are licensed to allow free and flexible use without expressed permission from the author, typically through one of the six Creative Commons licenses. Creative Commons allow materials to be reproduced, customized, or distributed as long as attribution requirements are met. Instructors may choose to use a particular edition of an open textbook indefinitely or may customize a text to suit their individual course needs. Open textbooks are also a part of the open educational resources (OER) movement that strives to make educational materials freely available to all.

With the rising cost of textbooks for university and community college students, interest in open textbooks is growing. A variety of groups including student organizations, higher education communities, and state governments are examining the problem of textbook affordability Open textbooks is considered one possible solution. For more information on this issue, visit the Community College Open Textbook Collaborative.

Open textbooks are a good source of content for a digital repository. Repositories not only provide a centralized location for the open text books, but add the value of indexing making the content more easily accessible and useful. A repository can also partner with an on-demand or other type of press to offer printed versions of the textbooks. Printing open textbooks by an on-demand publisher can also provide a modest revenue stream for a repository and university press. The Rice University Press and Connexions repository have forged a strong relationship that has reinvigorated the financial viability of the Rice University Press.

Faculty members can select one of the open textbooks available in the Connexions repository for use in a course. Students may then download a PDF version of the book from the repository for free. Or, if they prefer to have a bound, printed version of the book, a link from the resource to Qoop, an on-demand publisher with whom Connexions has partnered, is provided. For example, students can have a bound copy of the text, *Collaborative Statistics*, delivered to their door for under $35.

The Orange Grove is exploring a similar model to reduce textbook costs for Florida students, encourage use of the repository, and secure stable funding. Repository administrators are working with many of the OER resource groups as well as The University Press of Florida(link) to develop a strategy to provide affordable textbooks to Florida students.

Open Textbook resources

- **Make Textbooks Affordable campaign:** http://www.maketextbooksaffordable.org
- **Student PIRGS**: http://www.studentpirgs.org/
- **Community College Consortium for Open Educational Resources:** http://cccoer.wordpress.com/ or http://www.collegeopentextbooks.org/

2. Faculty/Institution Developed or Produced Content. Institutions and individual faculty members may create digital content or other instructional items as part of their research and teaching. Once faculty become more familiar with the implemented repository and see how the system works, they may want to share items they have created.

By including their content in the repository, faculty members can reach a wider audience and increase their profile within the scholarly community, particularly if their institution recognizes digital publishing as evidence of scholarship. For other users not so familiar with the creation of digital content, you can offer training in this area. (This will be discussed in detail in the next section, workshops and training). Educators appreciate the opportunity for their teaching resources to be reused by others in the educational community. For example Alex Dickison, an instructor at Seminole Community College in Florida, recently gave staff permission for 298 of his digital instructional resources to be housed in The Orange Grove for use by any educator.

3. State Developed, Licensed or Grant Funded Content. If finances permit, you might also consider offering grants to create content to fill specific needs. In the request for proposals, be sure to communicate clearly that your repository must serve as a dissemination vehicle for these resources. As the granting entity, you choose how open or restrictive the use of the materials created will be. In some cases, you may want to make the resources freely available or license them under one of the less restrictive Creative Commons licenses, such as "attribution only" (link to cc). In other instances, you may wish to limit access. For example, if state money is used to create the resources, you may be required to limit access to state educators only. The Kentucky Learning Depot has developed some language that details this type of agreement between the repository and the content creators.

Language for State-funded Digital Content to Be Contributed to The Kentucky Learning Depot Draft (October 20, 2008)
The grant recipient hereby agrees that in accepting funds for the development of digital content that it will adhere to the standards established by the Kentucky Learning Depot, including metadata (http://kylearningdepot.org). The developers of the digital content will be oriented by the Depot staff if needed.

The grant recipient further agrees that any and all digital content developed in conjunction with this grant, shall be made available free of charge through the Kentucky Learning Depot for the non-commercial use of the Kentucky P-20 education community. The Kentucky Learning Depot shall use all reasonable care to ensure that only members of the Kentucky P-20 education community have access to the content. Options to extend the use of this content free of charge to the SREB members and others are available if so chosen.

The Kentucky Learning Depot acknowledges that the grant recipient of the digital content retains ownership of and intellectual property rights in the content developed with the specific exception of the availability of this content to the Kentucky P-20 education community.

It is the intention of the Kentucky Learning Depot to make additional distribution arrangements available to a grant recipient, but the Kentucky Learning Depot at this time makes no guarantees or claims that such options will be available at a date certain.

You should also encourage members of your stakeholder group to contribute any content they have created. Additional ideas for pursuing this source of content will be discussed in the sections "marketing and training."

4. Federal Grant Products. The federal government requires that work products from grants be disseminated. For example the National Science Foundation's (NSF) policy states, "NSF advocates and encourages open scientific and engineering communication. NSF expects significant findings from research it supports to be promptly submitted for publication, with authorship that accurately reflects the

contributions of those involved.” Your repository can serve as the dissemination vehicle for such projects. Work with grant offices at various institutions in your state to offer your repository's services.

Marketing & Training

During operational planning, you developed a change management plan that included identifying the marketing and training materials you wish to use. Now that the repository pilot launch is at hand, review your plans and revise to include additional marketing methods you have discovered.

Be sure to address the following areas:

- Marketing Materials
- Communication Channels
- Workshops & Training
- Tutorials

1. Marketing Materials. Review and pilot marketing materials. Earlier in the planning phase of the Blueprint, we discussed a variety of ways to market your repository, from print materials and promotional items to videos and websites. Now is the time to produce and distribute these materials. Develop a timeline showing when each item will be produced, reviewed, finalized, and introduced. The timeline should also include when and how each item will be made available: through the web, the repository, or other methods (e.g., mailing, distribution at meetings and conferences). Finally, be sure the timeline includes the minimal materials needed to introduce your pilot implementation to the selected users. You can use the feedback from the pilot group on these materials to improve marketing when you launch your expanded implementation.

The pilot is geared toward a limited group of users, so be sure to create marketing materials targeted toward the interests and expertise of your specific pilot audience. Include materials that illustrate use of the repository, perhaps on how instructors could incorporate digital content into their courses. If your pilot group is focused on several disciplines, consider highlighting repository content in those subject areas and demonstrating how it can be incorporated into a course in the pilot LMS system(s). A testimonial from a faculty member about the advantages of using digital content in his or her teaching is an excellent marketing technique. Consider creating online tutorials and/or training sessions on demonstrating how to use the repository, flyers and information sheets that featuring particular content or other repository capabilities, and PowerPoint slide presentations. Project staff can use these materials, or institutional staff or faculty can use them to introduce the repository to faculty at pilot campuses. You should also house the marketing materials in the repository and make them available on your project website.

Send out a **press release** in advance to create interest and generate buzz about the launch of the repository. Depending on the scope of your pilot, consider sending announcements to institutions, newspapers, radio stations, and television stations. You may want to schedule a press conference announcing the pilot implementation, along with press releases to the media. If you pilot at one or more institutions, place your announcements in existing campus print and online publications to promote awareness of your initiative. Create support before the pilot launch by providing informational brochures to potential users ahead of the event. All these activities spread the word about the repository and recruit users for a successful pilot launch.

2. Develop communication channels. Clear and adequate channels of communication that not only dispense information about the repository but also receive feedback from your users are vital to implementing a repository that is useful and successful.

- A **website** is a natural place to invite repository users to communicate their needs or suggestions. Your website can be linked directly to the repository to allow a user to access it easily (See The Orange Grove website: http://www.theorangegrove.org/).
- You may also want to include a **blog**, **wiki**, or a **forum** on the site to collect user responses and facilitate discussion.
- **Newsletters**, either email or print, inform users about new training opportunities, new features, new content, etc. Keeping messages about the repository and its benefits for individual faculty members front and center stage is important.

- Gather **frequently asked questions** to provide answers to common queries and give general information.
- Other cost effective communication tools include: **discussion boards**, **best practice showcases**, and **virtual or face-to-face workshops.**
- Enlist "**champions**" for your repository. As we discussed earlier, The Orange Grove is using two "faculty advisors" at individual institutions to champion the repository directly to faculty. Our experience has been that a "trickle-down" approach of marketing through administrative channels has not gained the level of faculty adoption we seek. Communicating from the "top-down" to gain support and buy-in from key administration at relevant institutions is important, but selling repository use through peer groups is more effective in reaching faculty.

3. Schedule workshops and presentations. Time your repository launch to capitalize on scheduled events. For example, in the fall, there are usually institution-wide faculty meetings and department level meetings. Request agenda time at one or more scheduled events to reach a large population of potential users. You or your repository representative at the institution can make presentations using PowerPoint slideshows or other materials. Reusable content works nicely here. Use faculty showcases, conferences, meetings, and other events opportunities to present during the year.

Schedule hands-on workshops throughout the academic year to help faculty learn how easy it is to use the repository. Workshops allow users to actually experience repository searching and to ask questions as they participate. Be sure to cover core repository functions (e.g., how to search for items, use items effectively in courses, and contribute items). The Orange Grove trains first year teachers how to search the content, link or download items for their courses, and contribute items they'd like to share with other faculty. When possible, The Orange Grove has integrated the repository with the faculty users' learning management systems for visibility and easier access.

You might also consider offering a workshop on instructing with digital resources. Many faculty members who teach either online or on-campus may not have much experience with digital content. In the workshop, you should focus on areas of particular interest to the workshop participants. If your participants are mathematics instructors, show them high quality math resources. Faculty members are more likely to embrace the new technology if they can envision how to immediately incorporate new resources into their teaching.

The most important point in any workshop occurs when faculty share success stories about using digital content. The Orange Grove Scholars/Advisors at Florida Gulf Coast University presented at a meeting of faculty from the College of Heath Professions. Prior to the meeting, the Scholars/Advisors searched The Orange Grove for materials of interest to this group and used them in the session. They introduced an item called The Nursing Station (http://florida.theorangegrove.org/og/items/33223552-24a8-eeed-542e-94985a50c597/1/nursing_station.swf) and asked participants to answer questions about patient diagnosis. They also introduced a item on IV dosages. (http://florida.theorangegrove.org/og/items/30df028c-159c-5c1d-3b06-014a2304929e/1/iv_practice.swf).

Feedback from participants in your training sessions (face-to-face, online, and recorded) gives you information on how to improve future workshops. This data can also be helpful for your long term evaluation, as well as useful in making adjustments to your system, training sessions, and processes.

Once users are familiar with searching for and using the content, you should encourage them to contribute their own items to the repository. Once users become contributors, they will feel ownership in the repository and will be helping you expand your collection. Consider offering advanced sessions on creating and sharing digital content to experienced users. Creating high quality resources often involves more than just a faculty member. Because sound instructional and graphic design practices are vital to the producing high-end digital content, consider involving institutional or statewide partners to support such projects. As related earlier, The Orange Grove offered a three-day workshop at Daytona Beach Community College (now known as Daytona State College). Faculty members, developers, and graphic

designers from multiple institutions gathered to create sharable content objects (SCOs) for mathematics courses. During the workshop, groups created design documents specifying the content of each object, practice questions, and accompanying graphics. Final production took place after the three-day workshop. During the sessions, faculty members experienced the process of producing digital content and are now contributors of new items for our repository.

In addition to face-to-face sessions, consider offering regular webinars on repository usage. The University System of Georgia launched their repository with a series of presentations for their users (http://coa.colstate.edu/usgshare_webinarseries.pdf). The Orange Grove offers monthly webinars focusing on different aspects of repository usage; many of these are archived, By offering webinars on a variety of days and times, you can reach users who are at remote locations or are unable to attend a face-to-face sessions.

4. Create user tutorials Short, asynchronous tutorials that users can access on an as-needed basis are another good practice. You can create tutorials in multiple formats: video, print, and screen captures. Add audio explanation with tools such as Camtasia, Captivate, or similar products, that provide “just in time” training and review opportunities. The Orange Grove staff has created a number of tutorials in Camtasia and Captivate. Over time, we’ve learned to shorten the length of each tutorial, so that users can more efficiently access brief explanations of those particular functions they are interested in.

Offer training sessions and workshops to faculty and administrators on a regular basis. There will always be individuals who need training or would like to review a recorded session, as well as those who might be interested in an “advanced” training on the developing and contributing content.

Monitor Implementation

Monitor the pilot implementation so that you can compare the actual results to your planned outcomes.

Ask the following questions:

1. Is the system running smoothly?
2. Does the support staff on the front lines have the needed resources to deal quickly with any problems that arise?
3. Are users satisfied with their repository experiences?

Provide the front line support staff with everything they need to deal quickly with any problems that arise.

Run available repository system reports to assess numbers of users and to gauge system traffic. Reports may include measures of usage such as the number of hits on each item, number of items in the repository, number of downloads, and numbers of users and user groups. Make sure that your hardware infrastructure is performing well and can meet the current and projected demand. Solicit periodic input from your users to gage their impressions of the repository and gather feedback for future improvements or modifications.

Evaluate Implementation

Review the implementation. Once your repository is implemented and up and running for a defined time period, you need to evaluate your system and make any necessary adjustments. During the operational planning phase, you decided how you would measure the success of your repository, and you developed an evaluation plan. Now you can begin to review the pilot implementation and identify its successes and weaknesses. If your project team does not include an experienced evaluator, you may wish to contract with one for advice and/or assistance in conducting the evaluation. Consider the stakeholder groups that you may need to satisfy with your evaluation data, as well as any current political priorities that your project data might support. If the results will be highly visible or critical for future funding, be sure to follow rigorous procedures in your evaluation and analysis. You will want everyone to have confidence in the results. Another alternative is to hire an external evaluator or locate one from another government agency to guarantee objective and authentic results.

Gather data. As suggested in the planning phase, review all the data you collected as you monitored the implementation (e.g. user feedback, system reports, service desk contacts, usage statistics) and assess these opinions and outcomes. Examine the feedback from participants in your training sessions (face-to-face, online, and recorded) regarding their opinions and suggestions for improvement. You might also consider following up your first analysis of data with focus groups or interviews to gather more in-depth information and insights into the data. Gather input from your strategic planning partners and other nonuser stakeholders.

Analyze your data. In the analysis of the data, multiple perspectives help you dig deeper regarding the meaning of the data. For example, a large number of users can indicate that many people are interested in the repository. Comparing this information with visits to the repository may lead to more useful insights. If you have perhaps 1000 registered users, but only 10 visitors to the repository a day, you might conclude that most registered users are not regularly accessing the repository. Many people may have registered for accounts in the excitement surrounding the launch, but have not actually used repository materials in their teaching. Or, it could be that users are downloading content for use, but your system is not able to track such usage directly. Surveys or interviews could help ferret out the best analysis.

Review user response. Similarly, you may want to consider how users are interacting with the repository. Are they simply searching for objects or also downloading or linking items as well? A user who searches the repository, but does not use the materials may not be finding what they need. Determine what items are receiving the most hits and downloads. Then research why these items are so attractive. You may want to find more similar types of items to add to your content. Are users contributing items? Why or why not? Following up on these questions could yield valuable information for future improvements.

Report on your evaluation, especially if you have positive results. Consider incorporating supporting data or statistics into your marketing materials for current and future implementations.

Scale-up/Full Implementation

Once you have evaluated your pilot implementation and made any necessary adjustments, consider expanding your implementation. There may be particular groups of users or institutions that are ready to use the repository. As you decide, consider a possible timeline as well as the resources you have for expansion. A pilot implementation has no set length of time. Would your repository benefit more by remaining small while you gain exposure and increase usage? Expansion may require additional staff, higher capacity system components, greater bandwidth, and expanded software licensing, as well as other resources. Your funding situation will obviously impact your decisions related to expansion. Involve your stakeholder groups and strategic planning partners in making this decision.

PHASE III: SUSTAINABILITY OF REPOSITORIES

When we think of sustainability, most of us think first about financial resources to ensure a repository's continued viability . But while financial stability is a primary consideration, there is more to maintaining a robust repository than ensuring adequate funding. In the report "Sustainability and Revenue Models for Online Academic Resources: An Ithaka Report," the authors suggest defining sustainability as the "ability to generate or gain access to the resources—financial or otherwise—needed to protect and increase the value of the content or service for those who use it." This broader definition takes into account other elements, in addition to finances, that are critical to continued success. The report offers, as one example, "a cadre of professors who contribute and edit content or the presence of a strong and vocal community of advocates…can play a vital role in the long-term success of a resource."

We will discuss the following important aspects of repository maintenance:

- implementing strategies to ensure financial stability
- gathering input from stakeholders and users to continue to meet evolving needs
- adapting the repository software to keep pace with emerging technology developments
- increasing the number of resources in the repository
- continuing to market the repository and train users on the system

Because repositories are relatively new phenomena, we are presenting information in this section as a series of case studies, sharing ideas and strategies from various currently successful repositories.

Links:
Sustainability and Revenue Models for Online Academic Resources: An Ithaka Report —
http://www.ithaka.org/ithaka-s-r/strategy/ithaka-case-studies-in-sustainability/report/SCA_Ithaka_SustainingDigitalResources_Report.pdf

Achieve Financial Stability

Maintaining and operating a repository incurs many ongoing expenses. These include maintaining and upgrading servers and equipment, software and programming, bandwidth, staffing, and other operating costs. These costs vary widely among repositories, according to size and usage. Each repository approaches the issue of funding differently. While some may enjoy a stable source of funding such as an ongoing legislative subsidy or institutional endowment, others repositories are dependent on more transient sources of support such as grants. Many receive funding on an annual basis and must constantly justify the need for continued funding.

Ultimately, a repository must use whatever funding method or model that best fits its particular needs and political situation. We have surveyed a number of repositories about strategies to ensure financial stability. Below are examples of different approaches to achieving of financial stability.

The Orange Grove. Obtaining K20 system wide support for a digital repository in Florida has been an uphill battle. For five years, we tried unsuccessfully to receive legislative funding. Then, in 2006-07, The Orange Grove received a legislative appropriation of $250,000 to buy a perpetual license for the Equella software that runs the repository. This appropriation was a direct result of support from the legislative chair of K12 appropriations. The remaining repository funding sources have been carryover dollars from the merger of two organizations and the support of the Florida Distance Learning Consortium for two full-time employees for multiple years. These carryover dollars have now been expended and are no longer available.

In spite of the 2006-07 one-time appropriation, our K12 state leadership has not supported our repository project, choosing to fund other projects through state grants. Some of these K12 grants now support the University of South Florida's Center for Instructional Technology (http://fcit.usf.edu/), a database and website of instructional "assets" and a Florida State University Learning Systems Institute project (www.cpalms.org) which is a custom programmed repository solution integrated with a database of the new Florida K12 learning standards.

Our state's shrinking revenues, resulting in multimillion dollar state budget cutbacks, has compounded the challenge for financial support. Our repository funding requests now compete with basic educational institutional needs such as faculty positions and salaries. Although there appeared to be many state supporters of our repository, including the governor's staff, we received no legislative appropriation this year. In spite of these adverse circumstances, in spring of 2009, our postsecondary state level leadership supported and approved the buyout of our repository software for use by educators from our colleges and universities.

How did we gain the attention of higher education leadership? Open textbooks. Because Florida tuition is increasing, higher education institutional leaders and postsecondary state leadership feel lower-cost textbooks is one way to reduce the burden on Florida students. The repository is a perfect vehicle to store and distribute these texts. We began adding open textbooks to the repository in late 2008 and demonstrating the ability of The Orange Grove to deliver these textbooks to faculty statewide.

To move this initiative forward, we have most recently developed plans to make the repository self-sustaining within three years. Our current business plan is based on a partnership with the University Press of Florida (UPF) to provide open access textbooks for general education courses in Florida. Given the millions of enrollments in these courses statewide, we could significantly reduce student textbook costs, while including a small fee to support the repository and UPF. With sufficient users, these small fees could bring enough financial support to maintain the repository software, market the open textbook concept to faculty, metatag resources, and hire faculty to write open textbooks for courses. We continue to explore ways to fund easy online customization of existing open textbooks by faculty who wish to mix, match, and/or create additional textbook components.

We are adding more textbooks to The Orange Grove weekly and now have around 100 open textbooks

available for faculty members to use under Creative Commons, GNU, or other open licenses.

For more information on the development of the Orange Grove Text Plus initiative, please see the case study in Appendix 13

Gather Input from Stakeholders

In *Sustainability and Revenue Models,* the authors point out that repositories "do not exist in a—vacuum—sustaining them requires that project leaders understand the unique value that the resource provides and where it fits within the competitive landscape." They suggest asking the following key questions:

- What does your repository contribute that sets it apart?
- Are its contents rare or unique or otherwise in particularly high demand?
- Does the repository provide important services or functionality that can be found nowhere else?
- What groups really care about the repository? Are there any secondary beneficiaries beyond its primary audience?
- How does service to this audience fit in with the organization's overarching mission?
- As the landscape changes, what must the project do to keep pace with the changing needs of its users?

During the planning stages, we stressed the importance of gathering a group of stakeholders. It is vital that you keep members of this stakeholder group involved in the repository as it continues to grow and develop. Through this ongoing contact, your staff can answer the questions posed above and learn how various constituencies use and regard the repository. Your user groups' needs are not static; and they may want the repository to fulfill new needs or serve additional purposes. Consider maintaining an advisory board or committee made up of members of your stakeholder groups. This committee can serve as a conduit for feedback from users and provide you with ideas for future directions.

Links:
Sustainability and Revenue Models for Online Academic Resources: An Ithaka Report —
http://www.ithaka.org/ithaka-s-r/strategy/ithaka-case-studies-in-sustainability/report/SCA_Ithaka_SustainingDigitalResources_Report.pdf

Technology Developments

Technology is constantly changing and improving—as anyone who has ever purchased a computer or electronic device is well aware. Repositories are purveyors of technology: administrators and technicians must keep abreast of the latest developments. Users will always desire the newest features—all the bells and whistles to keep the repository user friendly and on the cutting edge.

Sustainability and Revenue Models puts it this way: "Sustaining the value of the resource requires more than just 'keeping the lights on'. As new technologies develop and user expectations shift and grow, a resource risks fading slowly into irrelevance if it does not constantly grow and innovate in ways that continue to benefit its constituents. Not doing this, in the most extreme cases, can result in a resource becoming inaccessible. More often, though, a static resource will lose value over time."

Even during the relatively short lifespan of The Orange Grove, we have already incorporated significant improvements in the software and technology. Our software provider, Equella, has worked with major learning management systems (LMS) to allow The Orange Grove to integrate directly into institutional LMSs. Users can automatically access the repository through their LMS, without the need for a separate repository login. The LMS users are authenticated behind the scenes. Newer versions of the repository software also incorporate some Web 2.0 tools and continue to evolve to an environment that can more easily be customized by individual users.

In an effort to keep the repository community up-to-date, we invite vendors and developers to present new products and technologies on our ongoing webinar series. Recently, representatives from Eduworks (http://www.eduworks.com/) demonstrated a tool that automatically generates metadata by analyzing the content of files and creating keywords and terms to describe the item.

Links:
Sustainability and Revenue Models for Online Academic Resources: An Ithaka Report —
http://www.ithaka.org/ithaka-s-r/strategy/ithaka-case-studies-in-sustainability/report/SCA_Ithaka_SustainingDigitalResources_Report.pdf

Increase the Number of Repository Resources

To continue growing, a viable repository must continually add content resources. One of the largest challenges still facing both institutional and statewide repositories is getting users to contribute materials to the collection. Different repository projects have used a number of strategies to encourage user contributions. They have developed content sharing standards to enable linking among repositories to offer users an expanding body of resources.

In "Towards a Knowledge Lifecycle: Populating Repositories 'Upstream'" The author points out that, "Even with clear guidelines and easy-to-use online facilities potential contributors have not yet incorporated regular repository deposit into their scholarly workflows."

To encourage content contribution, staff must do everything possible to remove real—or perceived—barriers. "Towards a Knowledge Lifecycle" identifies 2 such obstacles as **"**time (deposit as an additional task for busy academics) and the complexity of copyright." The time needed to deposit an item is a concern for many faculty members. The Orange Grove has addressed this issue by making the contribution process as simple as possible. Users can easily add items to the repository through a series of online forms that prompt the contributor to fill in pertinent metadata and other descriptions.

The copyright issue is more difficult. Faculty members, of course, want to maintain control over their work and intellectual property. They must feel confident that they maintain ownership of their work when they deposit it in a repository. Education is really the only way to alleviate these concerns. Creative Commons (http://creativecommons.org/) offers a variety of licenses that people can use to protect their copyright while still allowing others to use the resources for educational purposes.

The Orange Grove encourages users to use Creative Commons licensing for items they contribute to the repository. The default copyright for items is the Creative Commons http://creativecommons.org/licenses/by-nc-sa/3.0/ (Attribution Non-Commercial Share Alike). This license specifies that others may "remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms. Others can download and redistribute your work…but they can also translate, make remixes, and produce new stories based on your work. All new work based on yours will carry the same license, so any derivatives will also be non-commercial in nature." The Orange Grove also allows users to replace the default copyright statement with their own which may be either more, or less, restrictive.

Links:
Towards a Knowledge Lifecycle: Populating Repositories 'Upstream'"—
http://expertvoices.nsdl.org/hatcheck/2008/12/16/towards-a-knowledge-lifecycle-populating-repositories-"upstream/
Creative Commons by-sc-na license (Attribution, Non-Commercial, Share Alike)http://creativecommons.org/licenses/by-nc-sa/3.0/

Market to and Train Users

You must work to keep users engaged with your repository and continue to recruit new clientele. As you implement new features and technologies, announce the innovations to the users and offer training on the new features.

Use your existing users as a resource to reach out to new ones. Offer current users opportunities to share their experiences. A satisfied user is often your best testimonial for the repository. Target new faculty and engage them from the beginning. New faculty orientations are usually offered prior to the start of the academic year; secure a spot on the agenda. Ongoing training sessions are also important; they allow you to constantly bring in new users.

We hope that this Blueprint will assist you in your attempts to develop a digital repository. For the most updated information, additional resources, and to join our community of practice, please visit our website: www.oncoreblueprint.org

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Leadership Meeting Worksheet

The purpose of this meeting is to discuss and agree on overarching project issues such as what the purpose of the repository will be, who will be involved in its planning and implementation, and how the start-up and sustainability of the repository will be funded.

This worksheet offers possible questions and issues to consider during this brainstorming session.

1. What new opportunities can the project create for your state?
    - Increased opportunity for statewide collaboration
    - establish common standards for statewide educational resources
    - State can take a leadership role in repository development
    - revenue generating opportunities (eg sell e-content, host repositories for other
    - state or private institutions or agencies)
    - new opportunities for sharing and collaboration among faculty members and
    - institutions

2. What expected or emerging opportunities can this project capitalize on?
    - Possibility to of integrating repository with statewide/national/institutional digital Libraries

3. What are the potential benefits (positive results) of this project for your state?
    - Increased access to faculty research materials
    - Raise profile of statewide institutions
    - Reduce each institution's IT management and development costs
    - Manage learning materials
    - Development of formal and informal learning communities
    - See Benefits Analysis Table for additional areas to consider

4. What statewide problems might this project help to solve?
    - Increase learning gains
    - Increase access to high quality learning materials (both distance and classroom students)
    - Maximize efficiency of faculty and institutional development efforts
    - Document institutional efforts statewide

5. Who can you target to assist in moving the project forward?

Strategic Planning Worksheet

Inputs to this Strategic Planning Meeting are answers to these questions solicited during Leadership Group Meeting:

A. What new opportunities can the project create for your state?
B. What expected or emerging opportunities can this project capitalize on?
C. What are the potential benefits (positive results) of this project for your state?
D. What statewide problems might this project help to solve?
E. Who can you target to assist in moving the project forward?

1. Review the high level decisions made by the Project Leadership Group
   A. Have there been any changes that might require an adjustment to decisions made in the Project Leadership Group meeting?
   B. Can your group add to the ideas put forward by the Leadership Group? (e.g., suggest additional opportunities, benefits, or problems solved)
   C. Remain aligned with the planned outlook and direction provided by the Project Leadership Group.

2. Define project values – the ideas and principles that underlie your project
   A. Idea: Use brainstorming techniques to gather unedited input from the group members. Work as a group to combine statements or words that refer to the same concepts.
   B. Create a rough definition for each term used, to be edited and reviewed at a later time.

3. Build on project values to create a draft vision statement for your project -- an idealized version of what your repository could be in an ideal world. This draft can be reviewed and edited as needed as your project takes shape.

4. Create a draft mission statement: a precise description of the project's purpose and expected results
   A. Consider why you wanted to create a repository in the first place
   B. What needs are you meeting and how the repository will meet those needs
   C. The mission should be aligned with the values and vision you drafted in the previous steps
   D. Use measurable language in describing your expected results

5. Create a list of the communities that you might serve. For each community, list the services, needs or priorities they have. Some examples:
   A. Community: Students
      1) Possible services: provide resources for undergraduate, graduate, returning/continuing education
      2) Possible services: support at-risk students; improve retention rates for students in targeted disciplines
      3) Possible services: work with libraries to provide resources for student online research, publication vehicle for student research and student-generated content
   B. Community: Educators
      1) Possible services: provide resources for professional development, certification
      2) Possible services: publication vehicle (toward tenure, research collaboration & publication, creation of learning resources)
   C. Community: Institutional administrators
      1) Possible services: administrators for documenting efforts

6. Address content issues
   A. What specific content areas will you address -- initially, and perhaps later?
      1) Academic subjects
      2) Educational levels (e.g., graduate, undergraduate)
      3) Training materials related to repository use
      4) Authoring/packaging tools

B. What existing content can you access and how will you go about gathering this content?
   1) Buy it
   2) Enter into agreements with publishers
   3) Solicit from faculty
   4) Access student-generated content (e.g., projects or coursework)
   5) Harvest and federate with other repositories
   6) Engage in online research and networking to seek content sources

C. Will you create new content for your repository?
   1) Consider the staffing, tools, time, and other resources that this will require.
   2) Potential resources for creating new content: commercial providers, faculty and institutional staff, students

D. What types of content will your repository accept?
   1) Technical types of content
      a. Will it house physical files?
      b. Will the repository refer to external resources (URLs)?
   2) Granularity of content – what types of digital resource aggregations will you house? Some examples of types and definitions are provided below.
      a. **Asset** - A single, raw media files such as an image, text snippet, audio or video clip, or applet
      b. **Information object** - Two or more pieces of digital content, such as web page (s), activities, simulations, animations, or tutorials that illustrate a principle, explain a concept, or describe a process or procedure. *Information objects* can be combined to form a *learning object*. Information objects can be disassembled into *content assets*.
      c. **Learning object** - A complete piece of instruction that contains all resources and tools required for a learner to complete the learning task. It includes the following:
         i. one or more objectives
         ii. content presentation for each objective
         iii. practice with feedback for each objective
         iv. assessment of each objective (graded or self-assessment)

         Learning objects are formed by assembling a relevant reusable *information objects*. Learning objects may be sequenced and bundled to form larger *learning components*, such as lessons and courses.
      d. **Learning Component** - A collection or group of *learning objects*. A *learning component* typically has multiple learning objectives or instructional purposes. One or more collections of *learning components* constitute a course.
      e. Entire course

7. Address funding issues

A. What funding is already secured?
B. What are potential or additional sources of funding? (e.g. legislative appropriation, institutional fee for use, revenue generating options, grants)
C. What funds are available for start-up?
D. What funds are available for maintenance of the repository?
E. Will the repository be free to use or will there be a fee involved?

8. Resources

A. What resources are already devoted to or could be used for the project?
   1) people (project director/manager, technical advisors for determining software/hardware requirements and ongoing input, technicians to manage the project)
   2) facilities
   3) hardware
   4) software

B. What additional resources are required?
   1) people (project director/manager, technical advisors for determining software/hardware requirements and ongoing input, technicians to manage the project)

2) facilities
3) hardware
4) software

9. Create strategic goals: Create goal statements with supporting objectives that describe:
A. Repository services you will provide and the communities you will serve
B. Repository resource content area(s) of focus, content acquisition methods, and acceptable content types
C. Tasks related to securing or ensuring funding
D. Tasks related to securing resources for the project This task may be accomplished more quickly by breaking into small groups to draft goals and objectives, with review and editing done by the large group.

10. Suggest methods to evaluate your progress toward each of the goals and objectives.

11. Prioritize: Create short-term and long-term priorities for your goals and for objectives within each goal; estimate time frames for completion.

12. Assign responsibility for the next level of operational research, recommendations, and decisions

13. Gain agreement on next steps and follow-up tasks.

Operational Planning Teams & Tasks

Operational Planning Tasks	Team Members	Task Completion Target Date
1. Project Management— Maintain oversight of the project as a whole and will facilitate the sharing of information amongst the teams		
2. Repository Users Planning—Policies & guidelines for **users** including: account eligibility and access and collection of user information		
3. Content Development and Acquisition—Develop policies & guidelines for **content** including: areas of focus, acquisition strategies, acceptable file formats, access and permissions, and copyright and maintenance issues		
4. Metadata Tasks— Policies & guidelines for **metadata** including: metadata schema to be used, method of attaching metadata to items, and required fields		
5. Quality Review Tasks—Policies & guidelines for **quality review** including: evaluation criteria for learning objects, review process and workflow for item reviews		
6 .Fiscal Planning—Research applicable funding sources, recommend most promising resources, and create processes and timelines for securing funds		
7. Technical Advisory Group: Software— Research available **software** platforms, develop selection criteria (gather input from other task groups, participate in review or RFP)		

8. Technical Advisory Group: Hardware & System Support— Research and selection of **technical infrastructure** needs including **hardware,** hosting, bandwidth, & facilities		
9. Staffing Assessment—Determine staffing requirements, identify available individuals who might be assigned to the project, develop position descriptions & duties, and research possible salaries		
10. Change Management Planning - Research and recommend structures for: • Marketing/awareness vehicles, strategies, and schedules • promoting adoption by users • discovery of existing shareable content with the state • capturing system problems and generating solutions		
11. Evaluation Planning—Develop Evaluation Plan, determine how you will gather information on user adoption and response, how you will review the project for things that might need to be changed, and how you will decided if the project is successful.		
12. Project Plan Development—Create a detailed project plan, develop a schedule which includes all project tasks and establish timeline for completion.		
13. Project Budget—draft a three-year project budget based on defined needs and funding models		

Each Operational Planning Team should review the relevant output from the Strategic Planning group. The output for each Team should be policies governing repository access and system requirements

Repository Users Team

Access

1. Will all repository functions (e.g. contributing, commenting, editing, downloading) be completely open to all your user communities (e.g. students, faculty, institutional administrators, state-level administrators commercial vendors)? If not, decide which groups will have access to which functions.

2. If access is restricted, is there a preferred method of control?
    - individual user accounts
    - institutional access (via learning management system or other)
    - by user community
    - guests/non-registered users
    - other

3. For each method identified in #2, how would you like to manage access?

User Info

1. What type of information do you want to collect about your users?
    1. Name
    2. Title
    3. Institution
    4. Areas of expertise
    5. email
    6. Other

User Support

1. How will users communicate their problems or questions to the repository support staff?
    - Email
    - Phone
    - Other

2. What services will be available for user support?
    - Help desk
    - On-call administrator
    - Other

Each Operational Planning Team should review the relevant output from the Strategic Planning group. The output for each Team should be policies governing repository access and system requirements

Content Organization and Acquisition

Content Types

1. For each community served, are there specific content focus areas? Examples:
   - students—subject areas and grade levels for learning resources
   - faculty—professional development, scholarship/research, collaboration (e.g. collaborative authoring of learning resources, research collaboration)
   - Administrators—institutional resources and documentation
   - System administrators—training materials and documentation

2. Are there specific subject areas or levels your repository will focus on first?

Content Acquisition

Explore and develop polices as need for the following content acquisition methods

1. Identify existing state-level content to be included
   - Distance learning courses
   - State-funded learning objects
   - other
2. Solicit from faculty and institutions
   - Identify possible institutional contacts
3. Harvest and federate with other repositories
   - Determine which federation standards your repository will support (once determined, make sure this information is communicated to the Software Review and Selection Team.
   - Identify other repositories for possible harvesting or federation.
4. Enter into agreements with publishers
   - Identify possible publishers to partner with
5. Access student-generated content
   - Establish policies governing student-generated content
6. Explore content Creation
   - If content will be created, is there adequate staff to accomplish this goal?

Content Format

1. Will the repository house physical files?
   - If so, must files play across platforms?
   - What formats are acceptable (i.e. single file, zip, IMS/SCORM packages, .exe files)
   - Are there file formats that are unacceptable?
2. Will the repository refer to external resources (URLs)?
3. Are there legal standard for accessibility that must be met? (e.g. 508 of the ADA)

Content Access

1. Establish content categories. Will some items be public and some items restricted?
2. Establish policies for restricted access items
   - Is there copyrighted or licensed materials which have usage restrictions?
   - Will there be different areas or collections for different users/institutions?
   - graded assessment items (test items)
3. Establish roles and permissions
   - Consider common roles (i.e. searcher, contributor, administrator)
   - Are there additional roles?

Copyright

1. What copyright policies and agreements will govern repository resources (i.e. Creative Commons, GNU General Public License, other)
2. Does any of your content have Digital Rights Management issues?

Content Maintenance

1. Will URL's be checked to ensure links are working? If this is to be done automatically, has this desire been communicated to the Software Review and Selection Team?
2. Will content be reviewed periodically to ensure it is not outdated? How often will review be done?

Each Operational Planning Team should review the relevant output from the Strategic Planning group. The output for each Team should be policies governing repository access and system requirements

Metadata

1. Select an international metadata schema. Commonly used metadata schemas are:
   - Dublin Core
   - Learning Object Metadata (LOM)
   - CanCore

2. Do any specialized fields need to be added?

3. Are all fields required? If not, which fields are mandatory?

4. Who will complete the metadata fields? (could be a combination)
   - Metadata reviewer
   - Contributor
   - Author
   - Other members involved in the quality review process

5. Metadata completion
   - Free text
   - Controlled completion (i.e. drop down menus, radio buttons, check boxes)
   - Which controlled vocabularies might you use?

6. Will the metadata by reviewed for accuracy? Who will review it?

7. Will users be able to add additional metadata (e.g. cloud tags, social bookmarking, comments on use of resources ratings)

Metadata Schema Field Comparisons

These lists indicate the metatdata fields used by each entitiy. IEEE LOM and Dublin Core are widely accepted metatdata schemas. The Orange Grove , University System of Georgia Repository, and the North Carolina Learning Object Repository are repositories that have developed customized schema based on the LOM.

IEEE LOM	Dublin Core	The Orange Grove	University System of GA	NC LOR
1. General				
1.1 Identifier	Identifier			
1.1.1 Catalog				
1.1.2 Entry				
1.2 Title	Title	Required	Required	Required
1.3 Language	Language	Optional	Required	Required
1.4 Description	Description	Required	Required	Optional
1.5 Keywords		Required	Required	Optional
1.6 Coverage	Coverage			Optional
1.7 Structure				
1.8 Aggregation Level				
2. Lifecycle				
2.1 Version				Required (date, auto-supplied)
2.2 Status				Optional
2.3 Contribute			Required	Optional
2.3.1 Role		Required	Optional	Optional
2.3.2 Entity	Creator/Contributor/Publisher	Required	Required	Optional
2.3.3 Date	Date	Optional (contribution date)		Optional
3. Meta Metadata				
3.1 Identifier				
3.1.1 Catalog				
3.1.2 Entry				
3.2 Contribute				
3.2.1 Role				
3.2.2 Entity				
3.2.3 Date				
3.3 Metadata Scheme				
3.4 Language				
4. Technical		Required		
4.1 Format	Format	Required	Optional	machine-generated(?) - would like to display with detailed record
4.2 Size				
4.3 Location				
4.3.2 Remote location				Required if item is not loaded into repository
4.4 Requirements				
4.4.1 Or Composite				
4.4.1.1 Type		Optional		
4.4.1.2 Name		Optional		
4.4.1.3 Minimum Version				
4.4.1.4 Maximum Version				
4.5 Installation Remarks		Optional		
4.6 Other Platform Requirements			Optional	Optional
4.7 Duration			Optional	Optional

IEEE LOM	Dublin Core	The Orange Grove	University System of GA	NC LOR
5 Educational				
5.1 Interactivity Type		Required	Optional	Optional
5.2 Learning Resource Type	Type	Required	Required	Optional
5.3 Interactivity Level		Optional		Optional
5.4 Semantic Density				
5.5 Intended End User Role		Required	Optional	Optional
5.6 Context		Optional	Required	Required
5.7 Typical Age Range		Required		Optional
5.8 Difficulty				Optional
5.9 Typical Learning Time		Required		Optional
5.10 Description		Optional	Optional	Optional
5.11 Language				
6. Rights	Rights		Required (choice of Creative Commons or custom license)	
6.1 Cost		Required	Required	Required
6.2 Copyright & Other Restrictions		Required	Required	Required
6.3 Description		Required	Required	Required (if either 6.1 or 6.1 are yes)
7. Relation	Relation			
7.1 Kind				
7.2 Resource				
7.2.1 Identifier				
7.2.1.1 Catalog				
7.2.1.2 Entry	Source			
7.2.2 Description				
8. Annotation				
8.1 Entity				
8.2 Date				
8.3 Description				Optional
9. Classification	Subject			
9.1 Purpose				Optional
9.2 Taxonpath				
9.2.1 source		Required [Subjects & Standards (ERIC, GEM, Sunshine State Standards (K12), Florida Statewide	Required [Classification of Instructional Programs (CIP)]	
9.2.2 Taxon				
9.2.2.1 ID				
9.2.2.2 Entry		Subjects & Standards (Term or Value)		
9.3 Description				
9.4 Keyword				
Additional non-LOM fields ➔		Resource Review (for accuracy)	Resource Review (for accuracy)	
		Sharing (system requirement)	Access (system requirement)	
			Allow users to download the files?	
			Can this item be edited?	
			Select one or more additional sources to publish to (not required)	

Each Operational Planning Team should review the relevant output from the Strategic Planning group. The output for each Team should be policies governing repository access and system requirements

Quality Review

1. Is a quality review process required for repository resources? Common areas for quality review are:
   - Content accuracy
   - Editorial review
   - Instructional Design review
   - Technical
   - Metadata

2. Who will perform the review?

3. How will you manage the review process?
   - Virtual management tool included in software
   - email, website

Orange Grove
Quality Review Process

Roles and Tasks

1. **Process Manager**: Manages the workflow process and facilitates communication among reviewers
   Task: Assigns individuals to specific reviewer roles for specific resources; manages emails, system alerts, and signoffs
   Qualifications: Knowledge of the workflow process

2. **Instructor or Subject Matter Expert (SME)**: Validates that the resource content is accurate.
   Task: Reviews resource content for accuracy; provides tagging/metadata information
   Qualifications:
   - Minimum: Instructor in the relevant subject area at accredited institution
   - Desirable: holds advanced degree in relevant subject area

   When can this review step be omitted?
   - For item types:
     - lesson plans (if an instructor/SME review is not conducted, the resource author should provide tagging/metadata information)
     - generic tools (tools that are NOT subject-specific), templates, or applications; if a tool is subject-specific (e.g., mortgage calculator, or calculating a person's weight on the moon; a SME review is needed to ensure the tool functions accurately)
   - When the resource is taken directly (verbatim) from:
     - a standard textbook or textbook component
     - peer-reviewed journal
     - a resource developed by the State of Florida for educator professional development

3. **Instructional Systems Design Reviewer**: Reviews resource for instructional quality
   Tasks: ensures all required components (objectives, content presentation, practice with feedback, and assessment) for lessons are present and aligned
   Qualifications:
   - Minimum: Formal academic training as instructional designer or instructional technologist
   - Desirable: experienced in designing/developing/evaluating web-based learning; holds advanced degree in instructional design or closely related field

   When can this review step be omitted?
   - For any resources that are NOT actual lessons: e.g., lesson plans, pictures or charts, professional/informational presentations

4. **Editor**: Reviews for correct grammar and spelling, typos
   Tasks: ensures all text uses correct grammar and punctuation
   Qualifications:
   - Minimum: Formal academic training as an editor; knowledge of web conventions
   - Desirable: experienced in editing web-based materials

   When can this review step be omitted?
   - When a resource does NOT contain any text (including titles or instructions)

- When the resource is taken directly (verbatim) from:
  - a standard textbook or textbook component
  - peer-reviewed journal
  - a resource developed by the State of Florida for educator professional development

5. **Technical and Accessibility Validator**

   Tasks:

   a. Verifies that the resource functions correctly in the local learning management system environment
   b. Ensures SCORM conformance (passes test suite)
   c. Ensures ADA compliance *[Currently we are not requiring conformance to ADA, but it is a future goal*]

   Qualifications:

   - **Minimum**:
     - Experienced in creating web based resources;
     - Experienced with SCORM compliance testing and problem resolution; ability to test assets and learning objects (content packages) against the adopted version of SCORM Test Suite.
     - Experienced in LMS functionality and related problem-solving.
   - **Desirable**: knowledge of ADA (section 508) requirements for web-based resources and how to achieve conformance.

   When can this review step be omitted?

   - This review is required for all digital resources

6. **Metadata Reviewer**: ensures metadata is complete and accurate according to defined metadata standards (*current standard is LOM v1.0: SCORE*)

   Qualifications:

   - Minimum: academically trained in cataloguing resources; familiar with metadata concepts and standards

   When can this review step be omitted?

   - This review is required for all digital resources

7. **Process Manager**: Upon completion of all reviews, the Process Manager
   - ensures all needed modifications (as defined by workflow team members) have been made
   - accepts the resource into the repository
   - sends an email to the resource author, notifying the author that the object is available in the repository, with a link to the resource, and explanation of how to view its metadata

For questions, please contact Susie Henderson at shenderson@distancelearn.org or Cathy Alfano at calfano@distancelearn.org

Staffing Tasks/Roles Worksheet

Staffed by:
***** existing staff member (E)
* new project hire (N),
* personnel on-loan from other agency/area (L)
*contractor (C)

Staffing Task or Role	**Necessary Task/role? Y/N**	**Assigned to: Position or job title** *(e.g., project manager, programmer)*	**Staffed by:**	**FTE %**	**Duties:**
Project Leadership					
Project Management					
Identify existing digital content for possible inclusion in repository					
Upload content into repository (single files)					
Upload content into repository (batch uploads)					
Metatag content					
Implement quality standards					
Content accuracy					
Instructional Design Review					
Editorial Review					
Technical Review					
Metadata Review					

Necessary Task/role? Y/N

Staffed by:
***** existing staff member (E)
* new project hire (N),
* personnel on-loan from other agency/area (L)
*contractor (C)

Staffing Tasks or Role		**Assigned to: Position or job title** *(e.g., project manager, programmer)*		**FTE %**	**Duties:**
User Services					
Management (create accounts, groups, roles)					
Provide training: Online					
Provide training: Face to face					
Provide user support/help					
Coordinate repository sectors (e.g., K12, community college, university, workforce, virtual education)					
Conduct marketing and awareness activities					
Create print materials					
Create electronic communication vehicles (e.g., websites, wiki/blog, webinars, video)					
Presentations					
Manage repository system (technical infrastructure on the hosting site)					
Manage repository system (customize software and repository functions)					

Necessary Task/role? Y/N

Staffed by:
***** existing staff member (E)
* new project hire (N),
* personnel on-loan from other agency/area (L)
*contractor (C)

Staffing Tasks or Role		**Assigned to:** **Position or job title** *(e.g., project manager, programmer)*		**FTE %**	**Duties:**
Research current practice and trends					
Evaluate repository effectiveness					
Create and manage problem reporting and resolution processes					
Additional Tasks					

Project Planning Worksheet: Operational Planning & Details

Task	Start Date	Finish Date	Assigned Staff	Notes
Develop Policies & Procedures				
1. Project Management				
Schedule regular sessions to manage issues/problems				
Develop communication & problem-solving processes				
2. Users & Services				
Determine criteria for repository access				
Determine how users will acquire their accounts				
Research institutional Learning Management Systems (LMS) integration				
Determine desired repository user information				
Establish user statistics collection policies				
Develop issue reporting processes (e.g., resource problems; technical problems)				
3. Content				
Determine accepted content subject areas and educational levels				
Identify content sources: existing state-level content				
Identify content sources: Solicit content from faculty and institutions				
Identify content sources: Harvest and federate with other repositories				
Identify content sources: Enter into agreements with publishers—				
Identify content sources: Access student-generated content				
Identify content sources: Create content				
Determine acceptable formats				
Determine acceptable file types (single file, zip file, IMS/SCORM package, executable file)				
Determine restrictions on content				
Establish user permissions (i.e. groups, roles)				

Task	Start Date	Finish Date	Assigned Staff	Notes
Research and adopt/create ADA/Section 508 Accessibility conformance requirements				
Research and adopt/create copyright policy				
Research and adopt/create DRM policy				
Research and adopt/create maintenance schedule				
4. Metadata				
Research and adopt/create metadata standards				
Research and adopt/create controlled vocabularies				
Determine required metadata fields				
Determine metadata entry process				
Determine metadata review process				
5. Quality Review				
Determine if repository will have a quality review process				
Decide on centralized or distributed model				
Determine areas for quality review				
6. Fiscal				
Gather and verify the details and timelines for obtaining secured or promised funds				
Plan for acquiring other identified potential funding sources				
If repository will have a fee, determine fees and collection and disbursement methods				
Plan Software & Hardware (infrastructure)				
1. Research and select software platform				
Research & decide: existing software or "home grown"				
If "home grown" - research & decide: outsource or hire				
research & decide: open source or commercial				
If open source - research & decide outsource or hire				
If commercial – research, develop, and draft Request for Proposals (RFP)				

Task	Start Date	Finish Date	Assigned Staff	Notes
2. Research and select hardware				
Hardware research: review current trends & practices in hardware systems for comparable projects				
Hardware planning: categorize the scale of your project				
Hardware planning: develop hardware plan to meet the needs of your project. Consider the following areas for your network and system: • availability • capacity • reliability • backup and operational recovery • scalability content driven technology needs				
Determine Staffing Requirements				
Identify tasks necessary to start and operate the repository				
Determine the skill set necessary to complete each task				
Assess the available staffing for possible reassignment, identify positions that will requires new hires				
Develop a staffing plan based on above assessment				
Develop Change Management Plan				
Develop diffusion plan				
Develop training plan				
Create training materials				
Determine communication structure				
Develop Evaluation Plan				
Draft 3-year budget				

	Task Name	Start	Finish
1	**Phase: Research & Planning**		
2	Research repositories and plan structure		
3	Create Repository Strategic Plan		
4	Create repository vision statement & initial strategies		
5	Marketing and communication plans; funding possibilities		
6	Plan and solicit sponsorships and partnerships		
7	Research and plan funding opportunities & efforts		
8	Create initial partnership structure across various sectors		
9	Higher education partners: community colleges, universities, Bd of Governors; CCL A		
10	Higher education partners: Private universities		
11	K-12 partners		
12	Regional, national, international partners [SREB, ADL Co-Lab]		
13	Create standards		
14	Research and adopt/create technical e-learning standards (SCORM)		
15	Research and adopt/create ADA/Section 508 Accessibility conformance requirements		
16	Research and adopt/create metadata standards		
17	Research and adopt/create copyright standards		
18	Research and adopt/create content quality standards for content packages		
19	Create technical infrastructure & processes		
20	Research and adopt/create repository software options		
21	Research and adopt/create workflow process for adding object to repository		
22	Update Repository Strategic Plan at specified intervals		
23	Create steering committee to encompass active and planned sector members		
24	Schedule regular sessions to manage issues/problems		
25	Incorporate new partners and initiatives if cost effective		
27	**Phase HE I - Pilot: MAT 1033 (Int. Algebra) and MAC 1105 (College Algebra) Resources**		
28	Planning		
29	Identify target sector and content area/courses		
30	Identify most challenging concepts in selected courses		
31	Determine timelines and scope		
32	Select and install repository software [troubleshooting; problem-solving; customization]		
33	Plan and staff repository management tasks (user accounts, categories)		
34	Conduct introductory training for repository software		
35	Solicit pilot partners		
36	Development partners: content experts, instructional designers, developers, metadata and copyri		
37	Institutional partners [access to instructors and students/student performance data for evaluation]		
38	Faculty partners to use learning resources in their courses		
39	Develop draft evaluation plan; include data collection during and after implementation		
40	Project Management		
41	Develop pilot project plan (deliverables & milestones; resources; reporting requirements for fundin		
42	Develop issue reporting processes (e.g., resource problems; technical problems)		
43	Develop communication & problem-solving processes		
44	Develop change control processes and risk management plans		
45	Acquistion/Development		
46	Update criteria and processes to search for learning resources		
47	Locate existing content		
48	Collaborate on developing new resources		
49	Evaluate and recommend existing content (as resources permit) to be added to Repository		

50	Implementation		
51	Implement communication & change control processes and risk management plans		
52	Conduct user training for repository software		
53	Provide educator training on using learning resources (for all targeted areas)		
54	Implement instruction using Repository resources (pilot project 1)		
55	Implement and manage ongoing issue reporting & problem resolution processes		
56	Conduct midterm information sharing among pilot participants to correct/adjust as required		
57	Pilot Evalution		
58	Solicit/verify pilot evaluation partners and stakeholders		
59	Develop detailed pilot evaluation plan including evaluation criteria, processes, and resources		
60	Assess student learning performance gains, student perceptions, and faculty perceptions		
61	Assess pilot project and create recommendations for improvement		
62	Update current structure, processes & plans to reflect results/recommendations		
63	Strategic Evaluation/ Assessment		
64	Solicit/verify partners and stakeholders		
65	Develop detailed plan including evaluation criteria, processes, and resources		
66	Conduct evaluation		
67	Assess results and create recommendations for improvement		
68	Update current process and plans to reflect results		
70	**Phase HE II - Expanded Implementation for Higher Education**		
71	Funding		
74	Planning		
75	Verify high-level sector partners and stakeholders		
76	Refine strategic plan to encompass wider implementation for this sector		
77	Input from partners & stakeholders on needs/priorities; revise plans as required		
78	Solicit members for any required committees		
79	Integrate sector plan with Repository Strategic Plan		
80	Assess marketing and communication efforts needed; plan as required		
81	Adjust & implement repository technical components as needed		
82	Define/adjust target courses and/or target concepts		
83	Solicit input from multiple stakeholders		
84	Consider cost-benefits: (e.g., instructional needs of faculty and learners)		
85	Update/revise change control processes as required		
86	Update/revise risk management plan as required		
87	Update criteria and processes (used in pilot project) to locate learning resources as required		
88	Solicit partners for this implementation		
89	Acquisition partners/resources to locate, vet, and describe resources		
90	Institutional partners [access to instructors and student performance data]		
91	Faculty partners to evaluate use of learning resources during Spring 2008		
92	Develop draft evaluation plan for this implementation		
93	Solicit input on evaluation plan; adjust as needed		
94	Project Management		
95	Update project plans as needed		
96	Adjust issue reporting processes (e.g., resource problems; technical problems)		
97	Adjust problem-solving processes as required		
98	Adjust project management reporting templates as required		
99	Acquire Resources		
100	Implement partners' search for learning resources		
101	Implement processes for partner searches		

102	Locate, evaluate & recommend existing content		
103	Identify any resource requirements for conformance to standards		
104	Add learning resources to repository		
105	Implement Marketing and Communication Plans		
106	Acquire marketing and communication resources/services		
107	Implement change control processes and risk management plans		
108	Create marketing & communication materials		
109	Distribute/implement marketing and communication materials		
110	Implement Learning Resources		
111	Provide educator training on using learning resources (for all targeted areas)		
112	Implement instruction using learning resources		
113	Implement and manage ongoing issue reporting & problem resolution processes		
114	Conduct periodic information sharing among participants to correct/adjust as required		
115	Evaluation (informal: onoing: formal: Spring 2008)		
116	Solicit/verify evaluation partners, stakeholders, and resources		
117	Develop detailed evaluation plans (criteria, processes and resources)		
118	Conduct informal evaluations (faculty/student perceptions)		
119	Implement formal evaluation (Asses student gains; student & faculty perceptions)		
120	Use evaluation results to recommend improvements		
121	Update current processes and plans to accommodate evaluation results/recommendations		
122	Preparation for Project Expansion		
123	Determine scope of future implementation efforts		
124	Adjust project plans, timelines, and cycles based on successes and recommendations		
126	**Phase HE III - Expanded Implementation for Higher Education**		
127	Funding		
128	Review funding status and update project plan if needed		
129	Planning		
130	Verify high-level sector partners and stakeholders		
131	Solicit members for any required committees		
132	Solicit stakeholder input on project plans and processes		
133	Assess marketing, risk management and communication efforts needed		
134	Assess repository hardware/software needs		
135	Define strategies for content acquisition		
136	Refine sector strategic plans to incorporate input		
137	Integrate sector plan with Repository strategic plan		
138	Solicit partners for this implementation		
139	Acquisition partners/resources		
140	Institutional partners [access to instructors & student data for evaluation]		
141	Faculty/instructor partners to use learning resources in their courses		
142	Develop draft evaluation plan for this implementation		
143	Project Management		
144	Update project plan as needed (deliverables, milestones, resources; reporting)		
145	Adjust issue reporting processes (e.g., resource problems; technical problems)		
146	Adjust problem-solving processes		
147	Adjust project management reporting templates		
148	Resource Acquisition		
149	Develop/update criteria and processes to acquire learning resources		
150	Resource tasks related to resource acquisition		
151	Locate or create content		

152	Evaluate content according to quality standards		
153	Recommend resources for use in repository; select resources for implementation		
154	Add learning resources to repository		
155	Implementation		
156	Implement change control processes and risk management plans		
157	Implement marketing and communication plans		
158	Provide educator training on using learning resources (for all targeted areas)		
159	Implement instruction using learning resources		
160	Implement and manage ongoing issue reporting & problem resolution processes		
161	Conduct periodic information sharing among participants to correct/adjust as required		
162	Evaluation (informal: ongoing; formal: Spring 2009)		
163	Solicit/verify evaluation partners, stakeholders, and resources		
164	Develop detailed evaluation plan (criteria, processes and resources)		
165	Implement evaluation plan (academic gains; student & teacher perceptions)		
166	Assess implementation for this phase and create recommendations for improvement		
167	Update current processes and plans to accommodate evaluation results/recommendations		
168	Preparation for Project Expansion		
169	Determine possible scope of future implementation efforts		
170	Adjust project plans, timelines, and cycles based on successes and recommendations		
172	**Phase PreK12 - I - Integration with Existing K12 Collections**		
173	Funding		
174	Review funding status and update project plan if needed		
175	Review software and hardware infrastructure; adjust as needed		
176	Planning		
177	Verify sector partners and stakeholders		
178	Identify: 1) DOE project resources and responsibilities; 2) FDLC project staff responsibilities		
179	Identify scope of pilot implementation		
180	Specify conformance standards required for integration		
181	Refine strategic plan to encompass implementation for this sector		
182	Input from partners & stakeholders on needs/priorities; revise plans as required		
183	Solicit members for any required committees		
184	Integrate sector plan with Repository Strategic Plan		
185	Assess marketing and communication efforts needed; plan as required		
186	Adjust & implement repository technical components as needed		
187	Define implementation scope and targeted collections		
188	Solicit input from multiple stakeholders		
189	Consider cost-benefits: (e.g., instructional needs of faculty and learners)		
190	Update/revise change control processes as required		
191	Update/revise risk management plan as required		
192	Update criteria and processes to locate learning resources as required		
193	Solicit partners for this implementation		
194	Acquisition partners/resources to locate, vet, and describe resources/collections		
195	Institutional/regional district partners [access to instructors and student performance data]		
196	Teaching/instructional partners to evaluate use of learning resources		
197	Develop draft evaluation plan for this implementation		
198	Solicit input on plan; adjust as needed		
199	Project Management		
200	Update project plan as needed (deliverables, milestones, resources; reporting requirements)		
201	Adjust issue reporting processes (e.g., resource problems; technical problems)		

202	Adjust problem-solving processes		
203	Adjust project management reporting templates		
204	Integrate with Florida K12 Collections		
205	Implement search for collections		
206	Locate, evaluate & recommend existing resources/collections		
207	Identify any tasks required for collections' conformance to standards		
208	Integrate collections/resources with repository		
209	Implement Marketing and Communication Plans		
210	Assess marketing and communication requirement, resources, and services option		
211	Implement change control processes and risk management plans		
212	Create marketing & communication materials		
213	Distribute/implement marketing and communication materials		
214	Implement Learning Resources		
215	Provide educator training on using learning resources (for all targeted areas)		
216	Implement instruction using learning resources		
217	Implement and manage ongoing issue reporting & problem resolution processes		
218	Conduct periodic information sharing among stakeholders & participants to correct/adjust as requ		
219	Evaluation		
220	Solicit/verify evaluation partners, stakeholders, and resources		
221	Develop detailed evaluation plans (criteria, processes and resources)		
222	Conduct informal evaluations (e.g., teacher/student perceptions)		
223	Implement formal evaluation (Asses student gains; student & teacher perceptions)		
224	Use evaluation results to recommend improvements		
225	Update current processes and plans to accommodate evaluation results/recommendations		
226	Preparation for Project Expansion		
227	Determine scope of future implementation efforts		
228	Adjust project plans, timelines, and cycles based on successes and recommendations		
230	**Phase PreK12 - I I Expanded Implementation for PreK12**		
231	Funding		
232	Review funding status and update project plan if needed		
233	Planning		
234	Verify high-level sector partners and stakeholders		
235	Solicit members for any required committees		
236	Solicit stakeholder input on project goals, plans and processes		
237	Assess marketing, risk management and communication efforts needed		
238	Assess repository hardware/software needs		
239	Define strategies for next phase of expansion		
240	Refine sector strategic plans to incorporate input		
241	Integrate sector plan with Repository Strategic Plan		
242	Solicit partners for this implementation		
243	Acquisition partners/resources		
244	Institutional partners [access to instructors & student data for evaluation]		
245	Faculty/instructor partners to use learning resources in their courses		
246	Develop draft evaluation plan for this implementation		
247	Project Management		
248	Update project plan as needed (deliverables, milestones, resources; reporting)		
249	Adjust issue reporting processes (e.g., resource problems; technical problems)		
250	Adjust problem-solving processes		
251	Adjust project management reporting templates		

252	Resource Acquisition		
253	Develop/update criteria and processes to acquire learning resources		
254	Resource tasks related to resource acquisition		
255	Locate or create content		
256	Evaluate content according to quality standards		
257	Recommend resources for use in repository; select resources for implementation		
258	Add learning resources to repository		
259	Implementation		
260	Implement change control processes and risk management plans		
261	Implement marketing and communication plans		
262	Provide educator training on using learning resources (for all targeted areas)		
263	Implement instruction using learning resources		
264	Implement and manage ongoing issue reporting & problem resolution processes		
265	Conduct periodic information sharing among participants to correct/adjust as required		
266	Evaluation		
267	Solicit/verify evaluation partners, stakeholders, and resources		
268	Develop detailed evaluation plan (criteria, processes and resources)		
269	Implement evaluation plan (academic gains; student & teacher perceptions)		
270	Assess implementation for this phase and create recommendations for improvement		
271	Update current processes and plans to accommodate evaluation results/recommendations		
272	Preparation for Project Expansion		
273	Determine possible scope of future implementation efforts		
274	Adjust project plans, timelines, and cycles based on successes and recommendations		

Florida's Orange Grove Repository: A Sustainability Case Study

Introduction

The Orange Grove

The Orange Grove repository, established in 2004, was designed as a K-20 repository to collect and store learning resources for use by Florida teachers, faculty, and educational institutions. From its inception, The Orange Grove was funded through the Florida Distance Learning Consortium (FDLC) as one of its main initiatives. In order to support the repository, the FDLC has sought funding for the repository in each legislative budget request since its creation.

The success of this strategy varied widely, dependant on a range of factors. Were there other projects competing for the same dollar? Could the project capture the attentions of a particular legislator who might be able to champion the project and secure funds? This was the struggle faced by The Orange Grove staff in each successive legislative session. The FDLC was most successful in acquire funding when it could be tied to a specific aspect of the project, such as $250,000 in 2006-07 to "buy out" a perpetual license for the entire state for the Equella software that runs the repository.

As the repository continued to develop and grow, the financial model of relying on legislative funding began to seem less and less tenable. The state's shrinking revenues, resulting in multimillion dollar state budget cutbacks, has compounded the challenge for financial support. Repository funding requests must now compete with basic educational institutional needs such as faculty positions and salaries. The project was left waiting until the end of each legislative session to find out if there would be any funds available to even maintain the existing system, much less improve or expand the initiative. Faced with this reality, The Orange Grove team began seeking alternative sources of funding.

Developing Need for Open Textbooks

At about the same time that the state and U.S. were experiencing loss in revenue and an economic decline, there was a ground swell of concern from students, parents, and other interest groups regarding the staggering rise in the cost of textbooks. The Advisory Committee on Student Financial Assistance reported in 2007 student textbooks could easily cost between $700 and $1000 annually. With the cost of college education increasing every year in general, addressing the rise in textbook costs was seen by state and federal legislators as one way of helping to defray the cost of obtaining a degree.As frustrations with the cost of textbooks increased, numerous groups began taking actions to address the issue. Student Public Interest Research Groups (SPIRG) and other student groups mobilized to bring their dissatisfaction with the situation to the attention of campus administrations at colleges and universities around the country. (http://www.studentpirgs.org/textbooks/)

As the movement for textbook affordability continued to grow, a number of college and university administrations and state agencies began exploring the issue, attempting to find remedies to lessen the financial burden on their students. Florida legislatures also took notice and began studying possible courses of action. Ideas ranged from increasing the market for used textbooks to instituting a textbook rental program to using technology to provide alternative delivery methods. Many states passed legislation, such as Florida's *Textbook affordability statute*, to help curb the rising cost of textbooks In Florida, the Department of Education issued the Textbook Affordability Workgroup report in which they provided recommendations for making textbooks affordable for students.(http:/www.leg.state.fl.us/STATUTES/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch1004/SEC085.HTM&Title=-%3e2009-%3eCh1004-%3eSection%20085)

Open Textbooks

One approach that emerged as a promising solution to reduce textbook costs was the use of "open access" or "open" textbooks. While open access textbooks are freely available online to download or print, there are modest costs to sustain the infrastructure and delivery system. SPIRG defines open textbooks as "complete digital textbooks that are accessible online at no cost, and affordable to purchase printed as a book." (http://www.maketextbooksaffordable.org/statement.asp?id2=37633)

Licenses that are attached to truly open textbooks are usually one of the Creative Commons (http://www.creativecommons.org/) license options. Some works are also in the public domain. Creative Commons licenses allow the original authors to keep the copyright but allow others to copy and distribute the work (http://creativecommons.org/learn/licenses/fullrights) provided they give credit (attribution) to the original author and abide by any other conditions the original author specifies. Many authors license their open textbooks to allow anyone to use, download, customize, print, and even make derivative works without expressed permission from the author.

The Orange Grove Texts Plus

The Orange Grove had long been an advocate for open educational resources and Creative Commons licensing. It is a central tenant of The Orange Grove's philosophy that broadly licensed resources which allow for sharing and repurposing of the material offer educators, students, and institutions the greatest educational benefits. As The Orange Grove staff delved more deeply into the open textbook issue, they realized that in addition to offering savings to students, open textbooks might also serve as a method to address the ongoing funding problems facing The Orange Grove. The repository staff began exploring the possibilities of using The Orange Grove as a means of distributing open textbooks. Staff members began locating open textbooks and created a collection within the repository to house them.

Similarly, the Florida Board of Governors (BOG), which oversees universities in the state system, also began looking into the textbook affordability issue in depth. One board member, who had heard The Orange Grove was adding open textbooks to the repository, suggested members of The Orange Grove staff meet with the University Press of Florida (UPF), the official publisher for the State University System. It was thought that the two groups would benefit by collaborating on the project. The UPF had expertise in the more traditional areas of book publishing such as editing, project development, and royalty structures, as well as having contacts in the world of publishers and booksellers. Representatives of these two organizations met and began discussing ways that they might collaborate to facilitate an effort toward textbook affordability. The result of this partnership was Orange Grove Texts *Plus* (OGT+).

Launched in September 2009, this new partnership combined the strengths of a digital repository, an on–demand printer, and a traditional book publisher. UPF supplies editorial staff, while The Orange Grove provides a mechanism to distribute free online copies of the book, or to order low-cost print copies from the print-on-demand printer, Integrated Book Technology. This on-demand printer was selected by UPF for the Orange Grove Texts *Plus* project.

The priorities of OGT+ are affordability, accessibility and adaptability. Students can read the books online and download them to their home computers (or mobile devices) for free. They can also order bound printed textbooks for up to half the cost of traditional textbooks. Orange Grove Texts *Plus* began with 120 textbooks and scholarly monographs free online, with more titles added on a continuing basis.

Open Access Textbook Task Force

Also in 2009, the Florida legislature passed *Section (s.) 1004.091(2), Florida Statutes (F.S.),* (http://www.leg.state.fl.us/statutes/index.cfm?mode=View%20Statutes&SubMenu=1&App_mode=Display_Statute&Search_String=1004.091&URL=CH1004/Sec091.HTM). This statute required a collaborative study for the development of a plan to promote and increase the use of open access textbooks as a way to reduce student textbook costs in the state of Florida.

In response, a twenty-three member Open Access Textbook Task Force (OATTF) was established in July 2009 to fulfill the requirements of the legislation. The task force had broad representation from Florida's university and college community – faculty, administrators, student government leaders, business officers, bookstores – as well as staff from the Board of Governors, Division of Florida Colleges, Florida Distance Learning Consortium, and the University Press of Florida. The task force benefitted from and reported on OGT+. The task force developed strategies for a number of issues related to the use of open textbooks, including: arguments for the use of open textbooks and strategies for facilitating adoptions. Some of the findings from the OATTF report surrounding these issues are detailed below.

Benefits of Open Textbooks

The open access textbook study undertaken by the OATTF is about both academics and economics. The economic merit of open access is straightforward: it can greatly reduce the high cost of textbooks which are a significant portion of higher education costs for students. However, the Task force suggests the academic merits and value of open access are even more compelling than saving dollars.

- **Quality.** A recent survey of Florida student government leaders indicated that open access textbooks used in their courses were perceived to be of the same quality as traditional publisher textbooks and a few students stated that they were of better quality. Robert Stewart, a professor of oceanography at Texas A&M University, cites the quality control element of open access textbooks as an additional benefit. Students and colleagues regularly send him comments relating to errors of fact, typographical errors, and suggestions for improvement. This information is then used in identifying areas to address for the next publication of his textbook.

- **Flexibility of access**. By allowing students options in the format in which they receive the textbook, students are able to access to resources they might not otherwise be able to afford. Books are generally free to read online, while some websites and repositories also offer links to print-on-demand publishers, enabling students to order low-cost print copies of textbooks and electronic student aids. In addition, having the entire book available online allows students access the book whenever and wherever they choose, without having to carry a physical textbook with them.

- **Flexibility of content** Open textbooks promote flexibility in faculty selection of textbook components. Where the copyright permissions allow, faculty are given the flexibility to adopt a textbook in its entirety, choose a combination of sections or chapters, combine components of multiple textbooks, or even include content that they have authored. Dr. Erik Christensen, South Florida Community College, customizes an open textbook each semester for his Physics with Calculus course. Despite some added work, he reports that his students are far more successful using the customized National Science Foundation open textbook and are pleased at the 700% reduction in textbook costs.

- **Currency of information**. Currency of information is crucial in some disciplines, such as technology, engineering, and medicine, and open access allows for ready changes and edits to keep the information up-to-date and relevant. For those disciplines in which the basic factual information does not quickly go out of date (2 plus 2 still equals 4) and is an important

component of general education textbooks, open access can increase efficiency by reducing the need to continually reinvent the wheel for basic courses.

- **Professional collaboration**. Open access promotes professional collaboration in the design, delivery, and assessment of courses by enabling those who are teaching and researching in a field to participate in the design and delivery of the textbooks that are used. This promotes faculty as stakeholders.

- **Active/interactive learning**. Open access promotes active learning by incorporating Web sites that engage students in ways that the single-format textbook does not.

- **Teaching and Learning Technology**. Educational repositories such as The Orange Grove Digital Repository offer a wealth of free simulations, flash animations, lesson plans, and multimedia objects in multiple disciplines ranging from biology to world languages. Repositories can be used as a tool to help faculty members organize supporting learning resources and provide easy access to the chosen textbook,

- **Savings.** Discussions in Florida regarding open textbooks have estimated some spectacular savings for Florida students using open access textbooks. For just one general education course, College Algebra (MAC1105), with an annual statewide enrollment of well over 100,000 students, reducing the typical textbook cost from $130 to $50 could amount to a yearly savings of $8 million for students. Florida's student government leaders overwhelmingly confirmed that textbook costs in Florida are too high and indicated their willingness to promote open texts to reduce costs.

Strategies for Adoption

The Open Access Text Task Force felt a sound approach to facilitate adoption was to focus on the general education courses that have the highest enrollment in the colleges and universities of Florida. This seemed like an effective way to provide a cost savings to the largest number of students and to introduce students to the concept of open textbooks. The OATTF obtained a list of the top 50 high-enrollment courses from the Board of Governors and the Division of Florida Colleges. Courses were prioritized by task force members, after consultation with appropriate staff at their individual institutions. The top six courses, in order of priority were determined to be:

1. College Algebra - MAC X105
2. Introduction to Psychology - PSY X012
3. Introduction to Statistics - STA X023
4. Principle of Macroeconomics – ECO 2013
5. Principles of Microeconomics - ECO 2023
6. Intermediate Algebra - MAC X033

The task force members concurred that some incentives would be needed to encourage widespread faculty adoption of open access textbooks. Commercial publishers often meet directly with the faculty, promoting packaged course materials, and eliminating the need for faculty members to expend time and energy on textbook selection or the development of supporting learning and teaching material. This suggests that comparable endeavors could be supported for open access textbooks.

Faculty incentives could include recognition, faculty stipends, student assistants, release time, grant awards, professional development, or additional technology. Institutions are strongly encouraged to raise awareness of pioneering instructors introducing open textbooks for their students or spotlighting innovative initiatives in technology areas. One example of an incentive program is being piloted at the University of West Florida. Monetary awards are made to faculty research and development accounts based upon the percentage of savings for students by an instructor's textbooks adoption.

Another aspect of facilitating the adoption of textbooks was the need to educate and inform faculty members about the advantages of open textbooks as well as how to go about adopting and open textbook. OGT+ joined forces with the Community College Consortium for Open Educational Resources (CCCOER) to offer training in this area to university and community college faculty in Florida. The CCCOER is a joint effort by the Foothill-De Anza Community College District, the League for Innovation in the Community College, and many other community colleges and university partners. Their goal is to develop and use open educational resources (OER), and especially open textbooks, in community college courses.

Several open textbook workshops, conducted by Jacky Hood of the CCCOER, were held in locations around the state including Orlando, Broward College (http://www.broward.edu/), and St. Petersburg College (http://www.spcollege.edu/). These workshops were open to all Florida higher education faculty and administrators interested in knowing more about how to use open textbooks to reduce the costs of textbooks for college students. The workshops were well attended and also offered training on how faculty members might become advocates for the use of open textbooks on their home campuses.

A Model for the Use of Open Textbooks

It was becoming increasingly obvious that open textbooks would be a big part of the future of The Orange Grove. However, this was a new area and there was not a model or guide for how such an initiative might be developed or supported. While open textbooks hold the promise to significantly reduce textbook costs for students, an effective model for their development and delivery was needed. This model must take a systematic approach to the textbook production and adoption system as it now exists in higher education.

To address this need, Susie Henderson applied for a grant from the Fund for the Improvement of Postsecondary Education (FIPSE) (http://www2.ed.gov/about/offices/list/ope/fipse/index.html) under the special focus competition "College Course Materials Rental Initiative" (http://www.ed.gov/programs/fipsesf/index.html) The goal of this grant is to develop an effective, sustainable and replicable model for the use of Open Access Textbooks. The FDLC received $300,000 over two years to develop this model.

This project proposes to create and present a sustainable model to discover, produce, and disseminate open textbooks. This Open Textbook Implementation Model will develop and then test processes and strategies that will be ready to disseminate among early adopter higher educational entities, academic presses, and educational systems. The outcomes from successful implementation of the model will be reduced textbook costs for students and increased recognition for digital publishing as a scholarly activity. We also envision more digital content being integrated into these online textbooks over time, increasing anytime/anywhere access for students.

Through this grant funding, staff members will determine the current status of open textbooks. Today, there are a variety of websites, repositories, and individual faculty web pages that offer access to open textbooks without any costs or restrictions to download or print a book. A few websites and repositories that offer open textbooks link to print on demand publishers, enabling students to order low-cost print copies of textbooks and electronic student aids. Some faculty members are selecting chapters or parts of open texts while adding content that they have authored to create their own customized textbooks. Flat World Knowledge, a new online print-on-demand vendor, claims that they are developing a model which offers royalties equal to or greater than those typically received from traditional publishers.

This grant project and its proposed model will build on the recent 2009 Florida legislative mandate that requires a higher education task force to study and identify any barriers to: faculty adoption and use of open textbooks, the production and distribution of open textbooks, and the implementation of open textbooks in general education courses.

Conclusion

The growing interest in textbook affordability and open access textbooks offers a new and exciting avenue for The Orange Grove to explore. Through the new FIPSE grant and the OGT+ partnership, The Orange Grove hopes to use open textbooks as a way to sustain the repository and achieve financial stability. The project seeks to address the rising cost of textbooks by providing students and researchers with high–quality scholarship that is affordable, accessible, and adaptable to reader preferences.

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Glossary

Asset
A **single**, media file such as an image, text snippet, audio or video clip, or applet (Adapted from**http://www.elearningguild.com/pdf/2/102902MGT-H.pdf)** This corresponds to the smallest level of aggregation in the LOM.

Dublin Core
Dublin Core is a metadata element set that is standard for cross-domain information resource description. It provides a simple and standardized set of conventions for describing things online in ways that make them easier to find. Dublin Core is widely used to describe digital materials such as video, sound, image, text, and composite media like web pages.

Federation
Federation is an agreement between two or more repositories which allows each repository to interact with the others based upon an agreed upon set of policies. Through federation, users may not only search for a learning object in one repository, they may also search for that object in any repositories with which it is federated.

Granularity
Granularity of digital learning resources refers to size, decomposability and the extent to which a resource is intended to be used as part of a larger resource. Granularity is important in defining and determining reusability. Each level of granularity has a different inherent degree of ability to be decomposed into more granular pieces, and each level of granularity has different inherent expectations for reuse.

A related term, *aggregation level*, is used in IEEE Learning Object Metadata (LOM) to describe "the functional granularity" of a learning object. The IEEE LOM Standard (IEEE LOM, 2002) is used in the learning technology community and is incorporated into other specifications and standards.

The Learnativity Foundation[http://www.learnativity.org/] has developed a content model or aggregation model (Wagner, 2002 at:http://www.elearningguild.com/pdf/2/102902MGT-H.pdf)that is useful for describing granularity.

IEEE LOM
The IEEE 1484.12.1 – 2002 Standard for Learning Object Metadata is an internationally-recognised open standard (published by the Institute of Electrical and Electronics Engineers Standards Association, New York) for the description of "learning objects". Relevant attributes of learning objects to be described include: type of object; author; owner; terms of distribution; format; and attributes, such as teaching or interaction style.

Information Object
Two or more pieces of digital content, such as web page (s), activities, simulations, animations, or tutorials that illustrate a principle, explain a concept, or describe a process or procedure. *Information objects* can be combined to form a *learning object*. Information objects can be disassembled into *content assets*. (Adapted from**http://www.elearningguild.com/pdf/2/102902MGT-H.pdf)** An information object corresponds to LOM aggregation level 1.

Learning Component
A collection or group of *learning objects*. A *learning component* typically has multiple learning objectives or instructional purposes. One or more collections of *learning components* constitute a course. A learning component corresponds to LOM aggregation level 3.

Learning Object
There are many definitions for *learning object*. A learning object can refer to any digital asset which can be used to enable teaching or learning. These assets might be simple images, documents, or media files, or they can be lessons, groups of lessons, or entire courses. A more formalized definition for a learning object is a resource that contains content, practice activities, and assessment items (either graded or self-assessment) that are linked to one or more

educational objectives. By either definition, learning objects are digital content that can be used and reused for teaching and learning. These objects are flexible, portable, interoperable (across any standard platforms) and accessible. Learning objects are formed by assembling a relevant reusable*information objects*. Learning objects may be sequenced and bundled to form larger *learning components*, such as lessons and courses.

LDAP
LDAP is used to look up encryption certificates, pointers to printers and other services on a network, and provide "single sign on" where one password for a user is shared between many services. LDAP is appropriate for any kind of directory-like information, where fast lookups and less-frequent updates are the norm. http://www.gracion.com/server/whatldap.html

Metadata
This term literally means “data about data.” In repositories, metadata is descriptive information attached to digital resources that allows cataloguing and aids in resource identification, management, and discovery.

OAI harvesting
This is a method for gathering together metadata from a number of distributed repositories into a combined data store. It allows digital repositories to expose metadata about their objects for harvesting by aggregators. The OAI-PMH protocol does not provide a search across this data; it makes it possible to bring the data together in one place. In order to provide services, the harvesting approach must be combined with other mechanisms. “Harvesters" from one repository search the metadata records in other repositories and return information on updated records. Harvesters can be set to search for new or updated items on a set schedule. Harvested metadata is stored in the harvesting repository, where it can be searched by repository users. If the user would like to access the actual resource associated with the metadata, the resource can then be retrieved from the repository where it resides. [Adapted from OAI for Beginners: Overview andInside CDL

Open Access
Open access refers to the practice of making materials freely available for all users to read and use.

Open Source
Open source refers to computer software in which the programming source code is openly available. For additional information, visit the Open Source Initiative: http://opensource.org/