

| Instructional Architect  | DLConnect  |
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| NSF End of project report: Questions to be addressed   | NSF End of year report: Questions to be addressed  |
| <b>Objectives</b>  |  |
| <p>1. Integration of Instructional Architect within the NSDL Core Integration System including access management, discovery and search, and an open specification to support the use of Instructional Architect by NSDL portals and collections.</p> <p>2. Extensions to Instructional Architect including support for sharing instructional products, for authoring different kinds of instructional resources, for personalized recommendations, for interoperability with commercial learning management systems, and for student use.</p> <p>3. Extended dissemination, sustainability, and evaluation of Instructional Architect.</p> | <p>1. Design and implement an innovative and powerful workshop model:</p> <ul style="list-style-type: none"> <li>• Develop a context-sensitive workshop model (<i>DLConnect</i>) on productive use of digital library (DL) resources in middle school settings. Develop an online version of the workshop curriculum for asynchronous access.</li> <li>• Using iterative design and research approach, enact the <i>DLConnect</i> model in workshops with target user groups and with different kinds of digital library sites. Evaluate curriculum enactments, revise, and document contextual differences as evidenced by differences in sites and users.</li> </ul> <p>2. Use evaluation and research to demonstrate effectiveness on learning and teaching: Adapt existing and develop new research instruments for documenting curriculum enactment and assess longitudinal change in teacher use of digital resources. Our evaluation team will use Appreciative Inquiry (Watkins and Mohr, 2001) methods to identify what workshop characteristics are particularly effective at increasing participant knowledge and practice.</p> <p>3. Leverage connections for widespread dissemination: Share tested curriculum, evaluation instruments, analyses and interpretation of findings to support more rigorous and extensive understanding. Disseminate via NSDL portal, MSPnet, conferences, and professional organizations, building on established networks of <i>DLConnect</i> participants.</p> <p>4. Establish a solid foundation for sustainability: Curriculum dissemination in conjunction within existing educational programs through the Utah Education Network and other Public Broadcasting System affiliates to support continuity beyond the grant.</p> |
| <b>Project Participants</b>  |  |
| In this section you will be asked:   |  |

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| 1. What people have worked on your project?   |   |
| PI: Mimi Recker<br>Co-PI: James T Dorward<br>Graduate student(s) : Jaeyang Park; Ye Liu; Bart Palmer  | PI: Mimi Recker<br>Co-PI: James T Dorward<br>Graduate student(s) : Deonne Dawson; Sam Halioris, Xin Mao   |
| 2. What other organizations have been involved as partners?   |   |
|   | Eastern Michigan University<br>Utah State University Research Foundation: Financial Support<br>Half time support for one graduate student assistant, Sam Halioris.  |
| 3. Have you had other collaborators or contacts?  |   |
| National Science Digital Library. Member of several working groups and standing committees.   | National Science Digital Library. Member of several working groups and standing committees.   |
| <b>Activities and Findings</b>  |   |
| This section will serve as your report to your program officer of your project's activities and findings. Please describe what you have done and what you have learned, broken down into four categories:   |   |
| 1. Describe the major research and education activities of the project.   |   |
| Our project consists of three objectives: 1) Integration of the Instructional Architect with the NSDL Core Integration System (CI); 2) extensions to Instructional Architect; and 3) dissemination, sustainability, and evaluation of the Instructional Architect.  | Our project consists of four objectives: 1) Design and implement an innovative and powerful workshop model; 2) Use evaluation and research to demonstrate effectiveness on learning and teaching; 3) Leverage connections for widespread dissemination; and 4) Establish a solid foundation for sustainability.   |
| 2. Describe the major findings resulting from these activities.   |   |
| 1) Through our usability testing, we found that users would like to share their projects with fellow teachers, utilize projects created by other teachers, and allow easier access for students. We were able to build these features into our product and have increased usage. Features were also added to the IA as a result of user feedback, including “project themes” that add color and graphics to the presentation, and a more professional user interface.<br>2) Impact from the workshops was measured in terms of: 1) knowledge of online resources for education and the NSDL, 2) attitudes about IA and technology use in the classroom, and 3) intended future use of IA in the classroom. Over 90% of participants knew what online resources for education were prior to taking the workshops, while less than 20% were familiar with the NSDL. After the workshops 100% of participants answered these items correctly. Interestingly, attitudes about technology in the classroom and the IA specifically; and reported | Research findings mirrored those for the IA grant in terms of knowledge, attitudes, and behavior with online resources for education. We have become more flexible in terms of the items we include on our measurement instrument that are targeted for specific user groups, moving to an item pool model. Additional feedback from users indicates that future product enhancements may include a “file grabber” utility that makes it easier for IA users to import their own digital resources into IA projects. Since we are encouraging users to make their IA projects public and to use projects created by other teachers, another future enhancement might allow users to “tag” their projects with a searchable code indicating what Utah CORE curriculum objective the project was used to teach. Also, as we work more closely with outside organizations to disseminate the IA, it has become clear that we need to increase the emphasis on training pre-service teachers at |

intentions to use the IA in the future were split between in-service teachers who reported: 1) different levels of personal experience using digital resources, 2) different levels of technology infrastructure in the school where they taught, and 3) either having or not having Internet access at home. Teachers who report more prior experience with online resources for education, better technology infrastructure in their school, and who report having the Internet at home are more likely to be positive about the need for and value of technology infrastructure and digital resources, and the IA itself. They are also more likely to report intention to use the IA in their classrooms in the future.

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The DLConnect professional development (PD) model has evolved as a synthesis of literature review and experience gained from past workshops; and addresses factors at the district, school, and teacher levels:

- PD is a process requiring distributed demonstrations, hand-on training, actual use, and peer interactions; “shotgun” approaches often do little to promote real change.
- PD is situated in authentic physical and social contexts, to take advantage of the fact that learning is situated, social, and distributed.
- PD is both relevant and flexible, linking content and technology standards to a clearly articulated vision in terms of student outcomes.
- People learn by doing, and historically too much focus in technology PD has been put on the mere mechanics of use, and on access issues, rather than on integration into classroom practice. Our model facilitates curricular integration, recognizing that good ideas become action through integration rather than through mere presentation.
- Educators need support at all levels to accomplish change, so our PD is fit into an overall plan for change at the school and district levels. Our model includes a needs analysis among administrators and teachers to ensure that we can balance individual needs with needs for organizational growth, while contributing to communication at all levels to encourage collaborative communities.

Our efforts to demonstrate impact on learning and teaching practice are manifest in dissertation research that will seek to extend current research in terms of both design and questions. A comparison group design will be used to measure and compare impact from our distributed PD model between two rural Utah school districts in the Fall and Spring of 2005-2006.

3. Describe the opportunities for training and development provided by your project

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| <p>This section lists research and teaching skills the Extending and Enhancing the Instructional Architect project has provided to those working on the project.</p> <p>Technology skills: The project provides research assistantships to Bart Palmer, Ye Liu, and Jaeyang Park, doctoral candidates in the Instructional Technology Department. As a result of their involvement in the project, they have increased their expertise in design, development, and evaluation of Web-based learning environments.</p> | <p>This section lists research and teaching skills the Extending and Enhancing the Instructional Architect project has provided to those working on the project.</p> <p>Research skills: The project provides a research assistantship to Sam Halioris. Mr. Halioris is a doctoral student in Utah State University's Research and Evaluation Methodology (REM) program. As a result of his involvement in the project, he has increased his instrument development, online survey implementation, data analysis and reporting, and institutional review board and informed consent skills.</p> <p>Teaching and Managerial skills: The project provides a research assistantship to Deonne Dawson. Ms. Dawson is a doctoral student in Instructional Technology and, as project manager, her primary responsibilities include coordinating teacher workshops, promoting workshops, arranging conference presentations, and facilitating teacher workshops. As a result of her involvement in the project, she has increased her expertise in writing proposals, development and implementation of workshop curriculum and instruction. Additional she has become a stronger team leader.</p> |
| <p>4. Describe outreach activities your project has undertaken.</p>   |  |
| <p>To date, we have conducted 4 training workshops for 14 pre-service teachers, 35 in-service teachers, and 13 library media specialists.</p>   | <p>To date, we have conducted 8 training workshops for 51 pre-service teachers, 59 in-service teachers, and 12 library media specialists.</p>  |
| <p><b>Publications and Products</b></p>   |  |
| <p>In this section, you will be asked to describe the tangible products coming out of your project. Specifically:</p>   |  |
| <p>1. What have you published as a result of this work?</p>   |  |
| <ul style="list-style-type: none"> <li>• Journal publications</li> </ul>  |  |
| <p>Recker, M., Dorward, J., Halioris, S., Dawson, D., &amp; Lyman, M. (2005, April). Teacher Use of Online Learning Resources: Assessing the Impact of a Participatory Workshop Model. Paper presented at the American Education Research Association, Montreal, Canada.</p> <p>Liu, Y., &amp; Recker, M. (2004) Supporting Teachers in the Design of Instruction using Learning Objects. Paper and presentation at AECT, Chicago, IL.</p>  | <p>Recker, M., Dorward, J., Dawson, D., Halioris, S., Liu, Y., Mao, X., Palmer, B., &amp; Park, J. (2005, June). You Can Lead a Horse to Water: Teacher Development and Use of Digital Library Resources. Paper presented at the Joint Conferences on Digital Libraries, Denver, CO. Nominated for best paper.</p>   |
| <ul style="list-style-type: none"> <li>• Books or other non-periodical, one-time publications</li> </ul>  |  |

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| <p>Recker, M., Dorward, J., Dawson, D., Halioris, S., Liu, Y., Mao, X., Palmer, B., &amp; Park, J. (in review). Teaching, Designing, and Sharing: A Context for Learning Objects. Chapter submitted to the book entitled Learning Object Applications &amp; Future Directions, Alex Koohang &amp; Keith Harman, editors.</p>   |   |
| <p>• Members of the project made several paper presentations at national conferences, including</p>  |   |
| <p>Recker, M. Dawson D., &amp; Dorward J. (2004). The Instructional Architect. Poster session at the NSDL Annual Conference, Chicago, IL.</p> <p>Liu, Y., Recker, M., &amp; Palmer, B. (2004). Building Accessible Educational Web Sites: The Law, Standards, Guidelines, Tools, and Lessons Learned. Presentation at AECT, Chicago, IL.</p>   | <p>Dawson, D. (2005, July). Connecting Students with Online Math and Science Learning Resources. Presentation at the Utah Rural Schools Conference, Cedar City, UT.</p> <p>Dawson, D., &amp; Recker, M. (2005, March). Connecting Teachers with Online Learning Resources. Workshop presented at the Utah Coalition for Educational Technology, Salt Lake City, UT.</p> <p>Recker, M. Dawson D., &amp; Dorward J. (2004, October). DLConnect: A Workshop Model for Teacher use of Online Learning Resources. Poster presented at the NSDL Annual Conference, Chicago, IL.</p> <p>Dawson, D. (2004) DLConnect: Diffusing Reusable Learning Objects in the Classroom. Paper presented at the 16th Annual Instructional Technology Institute, Logan, UT.</p> |
| <p>2. What Web site or other Internet site have you created?</p>   |   |
| <p><a href="http://ia.usu.edu">http://ia.usu.edu</a></p> <p>The Instructional Architect is the software that enables users to search, select, compile, annotate, and publish instructional web-pages using online digital resources from NSDL. Our project has made regular revisions to the software based on information from workshop participants obtained through formative evaluation. In addition to these revisions, our project has made available to the public, some of the web-pages created by workshop participants.</p> | <p><a href="http://dlconnect.usu.edu">dlconnect.usu.edu</a></p> <p>The DLConnect website is designed to target fellow researchers and teachers. Researchers have access to publications, annual reports, conference presentations, annual meetings, and instruments. Teachers can access the Instructional Architect or register interest in receiving professional development training.</p>   |
| <p>3. What other specific products (databases, physical collections, educational aids, software, instruments, or the like) have you developed?</p>   |   |
| <p>Project activities have resulted in a valid and reliable online survey and associated protocol designed to assess change in teacher use of online digital resources.</p>  | <p><b>Online curriculum</b></p>   |
| <p><b>Contributions</b></p>  |   |
| <p>Now we invite you to explain ways in which your work, your findings, and specific products of your project are significant. Describe the unique contributions, major accomplishments, innovations and successes of your project relative to :</p>   |   |
| <p>1. the principal discipline(s) of the project;</p>  |   |

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| <p>The project and its associated software, Instructional Architect has the overarching goal of making STEM digital library learning resources easier for non-technical users to find and assemble in support of teaching and learning. At the same time, it has the goal of fostering communities of teachers and learners who will use the NSDL.</p> |  |
| <p>2. other disciplines of science or engineering;</p>   |  |
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| <p>3. the development of human resources;</p>  |  |
| <p>* offered research opportunities for doctoral students at Utah State University.<br/>* involved K-12 STEM pre- and in-service teachers, and school library media specialists.</p>   | <p>* offered research opportunities for doctoral students at Utah State University.<br/>* involved K-12 STEM pre- and in-service teachers, and school library media specialists.</p> |
| <p>4. the physical, institutional, or information resources that form the infrastructure for research and education; and</p>   |  |
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| <p>5. other aspects of public welfare beyond science and engineering, such as commercial technology, the economy, cost-efficient environmental protection, or solutions to social problems</p>   |  |
| <p><b>OBJECTIVES AND SCOPE</b></p>   |  |
| <p>A brief summary of the work to be performed during the next year of support if changed from the original proposal.</p>  |  |
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