



Research UPDATE

College of Education
Utah State University

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The Instructional Architect Project: Using Digital Learning Resources for Instruction



Much recent research has focused on building Internet-based digital libraries. Within educational applications, a primary goal of these libraries is to provide users with a way to access digital learning resources, often called "learning objects." However, the contents of a digital library are only useful when they can be found, accessed, used, and reused in learning situations by nonspecialist users.

With funding from the National Science Foundation, several faculty members in Instructional Technology (Mimi Recker, David Wiley, Andrew Walker, Jaeyang Park) along with Jim Dorward (Elementary Education) and Derek Reinke (REM graduate student), have designed, developed, and evaluated an Internet-based service portal, called the Instructional Architect (IA). IA is dedicated to making learning resources located in digital libraries easier to use and assemble for instructional purposes. IA also has the goal of fostering "communities" of teachers and learners who will use the NSF-sponsored National STEM Digital Library (NSDL). (<http://ia.usu.edu>)

IA is a set of tools that function together to facilitate the discovery, selection, and instructional use of learning resources stored within partner digital libraries. The user-centered evaluation activities completed by this team, suggest that IA can be an important means for enhancing teachers' use of digital library resources. IA provides a simple interface to a complex web of resources, and a means to create a personalized and permanent collection of high-quality digital resources for learning.

From the Associate Dean

The hard work of several College of Education faculty has paid off in the form of research grant awards from the University. Eight new faculty grant proposals were funded for 2002-03. Grant recipients are: Joanne Bentley (Instructional Technology); Melanie Domenech-Rodriguez (Psychology); Renee Galliher (Psychology); Donna Gilbertson (Psychology); Mark Krumm (ComDDE); Steve Lehman (Psychology); Robert Morgan (Special Education and Rehabilitation); and Tim Tansey (Special Education and Rehabilitation).

Congratulations are also in order for Susan Crowley (Psychology) and Cyndi Rowland (CPD); Kevins Masters (Psychology); Mark Krumm (ComDDE); and William Strong (Secondary Education) for receiving funding on their CURI grant proposals for 2003-03.

It is this kind of dedication and effort that has given the College of Education its reputation for scholarly excellence and research productivity. In this newsletter we feature some of the ground breaking research going on in the Instructional Technology Department.

Carol Strong



First Principles of Instruction

The single question which has guided Dr. M. David Merrill's research for more than thirty-four years is: "How can we use instructional design to make learning maximally efficient, effective, and appealing?" In trying to answer this question Dr. Merrill has explored both experimental and design research in learning, instructional strategies, and knowledge analysis.

Recent years have seen a proliferation of instructional design theories and models, and so, for the past two years Dr. Merrill has been studying instructional design theories and models and

research on instruction in an attempt to determine if there is a set of underlying principles on which most of these theories and the corresponding research agree. Merrill has identified some first principles of instruction that are almost always true regardless of theoretical orientation, instructional delivery system, or instructional architecture.

1. Learning is promoted when learners are engaged in solving real-world problems.
2. Learning is promoted when relevant previous experience is activated.
3. Learning is promoted when the instruction demonstrates what is to be learned rather than merely telling information about what is to be learned.
4. Learning is promoted when learners are required to use their new knowledge or skill to solve problems.
5. Learning is promoted when learners are encouraged to integrate (transfer) the new.

Dr. Merrill and his colleagues recently completed a major empirical study of the application of these principles. They compared the existing computer application instruction of a major training company with a revised course that implemented some of the first principles of instruction. The results were impressive. On an examination that consisted of using the computer application for three real-world tasks, the first principles group scored 89% whereas the group using the commercial instruction scored 68%. The first principles group completed the three tasks in 29 minutes; the commercial instruction group required 49 minutes. The first principles group expressed far greater satisfaction with the course than did the commercial instruction group. All differences were statistically significant.

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COE Research Council: Jim Dorward • Nick Eastmond • Rich Gordin • Grace Huerta • Richard Roberts • Julie Smart • Carol Strong • Karl White

David Wiley, Assistant Professor and Researcher Extra Ordinaire

David Wiley, an assistant professor in the Instructional Technology Department recently received a five-year NSF Career Grant, the agency's most prestigious award for young faculty members. The focus of the grant is to increase the understanding of how stable, informal learning occurs in large, distributed, decentralized online communities. Erin Edwards and Stephanie Allen, two Instructional Technology doctoral students, are making significant contributions to this project.



David has been busy with several other projects as well. Along with Stephanie and Erin, he recently finished a contract with the Cisco Learning Institute in which instruction was provided about the future of education and how the Internet is affecting its direction. In addition, David created an introductory course about “learning objects,” an instructional design paradigm modeled on notions of object-orientation from computer science. David has also been involved in the design and prototype of a Napster-like system for sharing educational resources like syllabi, lecture notes, and homework problems. This project was funded by the Office of the Vice President for Research at Utah State University.

Andy Gibbons (Instructional Technology) and David Wiley are currently working on a contract for the Institute for Defense Analyses in which they are designing instruction and other design supports for organizations that must adhere to national and international learning technology standards when creating computer-based instruction. Drs. Gibbons and Wiley are also providing formative feedback on the standards themselves. This high impact, open-ended project is architected around David's dissertation.

One other project David is involved in is the NSF-funded “Instructional Architect” project, a piece of software that helps non-techies access instructional resources within digital libraries for use in their own instruction, whether online or face-to-face. This project is described in more detail on the front of this newsletter.

The College is fortunate to have active researchers like David Wiley contributing so significantly to the research mission of the College.