Early Childhood Technology Integrated Instructional System (EC-TIIS) Phase 1:

A Final Report

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Abstract

The Early Childhood Technology Integrated Instructional System (EC-TIIS), a Steppingstones of Technology Innovation Phase 1—Development project, was developed by the Center for Best Practices in Early Childhood (the Center) at Western Illinois University as an online instructional system. EC-TIIS' ultimate goal was to improve technology services to young children with disabilities by offering access to effective family and professional development materials in a web-based system of learning opportunities organized in an easy-to-use, accessible format. The EC-TIIS website is found at <www.wiu.edu/ectiis/>.

EC-TIIS combined training content from tested and effective early childhood technology-related projects into a series of nine online workshops designed to provide needed knowledge and skills to adults responsible for educational programs for young children. Workshops include *Adaptations; Computer Environment; Curriculum Integration; Emergent Literacy; Expressive Arts; Family Participation; Math, Science, and Social Studies; Software Evaluation; and Technology Assessment*. Each workshop contains text, graphics of children using technology, links to outside resources, and downloadable files of curriculum activities, articles, and further information about each topic. The technologies addressed include computers, software, adaptive input and output devices, digital cameras, digital video, scanners, and other electronic media.

Participants included teachers from four field test sites and an eight-member Advisory Panel of professionals and family members. These 12 participants provided feedback and assistance in planning and developing the website in regards to appearance, content, and navigation.

Project staff disseminated information about the EC-TIIS website during 13 conference presentations. Five presentations focused specifically on the EC-TIIS website and online training

opportunities. Brochures developed in Year 2 were distributed to conference participants and persons requesting information through the website.

The Center for Best Practices in Early Childhood received funding in October 2002 through the Steppingstones of Technology Innovation competition to take EC-TIIS into Phase 2 - Research on Effectiveness. The website developed in Phase 1 is being further refined and tested to demonstrate that its approach is effective for training adults to use technology to improve results for young children with disabilities.

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Project Goal and Objectives

To achieve the goal of improving technology services to young children with disabilities, the Early Childhood Technology Integrated Instructional System (EC-TIIS) was funded by the U.S. Department of Education as a 2-year Phase 1 Steppingstones of Technology Development project. EC-TIIS combined training content from tested and effective early childhood projects developed by staff at the Center for Best Practices in Early Childhood (formerly Macomb Projects) and developed a series of nine online workshops designed to provide knowledge and skills to adults responsible for educational programs for young children with disabilities. The workshops are available at <www.wiu.edu/ectiis/>. Five objectives and their accompanying tasks included accomplishing management activities, identifying workshop content, designing and developing the web site, evaluating the site's usability and effectiveness, and disseminating information.

Theoretical Framework of the Project

Benefits of Online Training

Technology supports adult learning and functions both as a delivery system and a content area (Imel, 1998). On any given day, one million adult Internet users are taking an online class (Pew, 2001). The web is expanding at an amazing rate as the amount of information there increases geometrically.

Website technology enhances adult learning with the potential to increase flexibility, provide access to expertise, facilitate discussion among learners who cannot meet face-to-face,

reduce feelings of isolation often experienced by nontraditional learners, increase learner autonomy, and support and promote constructivist and collaborative learning (Burge, 1994; Cahoon, 1998; Eastmond, 1998; Field, 1997). Horton (2000) points out that web-based training "*does not change how humans learn but it does change how we teach them*" (p.6) and adds that training via the web makes producing learning experiences for people at a distance "*easier and less expensive*."

Research on the effects of technology for adult learning point to the importance of using a variety of multimedia tools and the web (Driscoll & Alexander, 1998; Graebner, 1998; Hyerle, 1996; Palloff & Pratt, 2001; Rosen, 1999; Rudestam & Schoenholtz-Read, 2002). When a training/learning site is instructionally well designed, guided practice for new solutions and independent skills practice are possible. Moreover, if a web site serves as a community of users, with built-in communication among other learners and trainers, the site enhances collaboration and information exchange.

Benefits of Technology for Children

Both literature and practice point to the important benefits of integrating technology into the preschool curriculum (Castellani & Jeffs, 2001; Gordon & Brown, 1996; Wright & Shade, 1994). Intervening with computers and other technologies, including adaptive peripheral devices or specialized software, produces changes in young children (Derer, Polsgrove & Reith, 1996; Hutinger & Johanson, 2000; Hutinger, Johanson, & Stoneburner, 1996). Evidence clearly points to the effectiveness of computers as access technology for young children with disabilities (Behrmann & Lahm, 1994; Brett, 1997; Clements, Nastasi, & Swaminathan, 1993; Godt, Hutinger, Robinson, & Schneider, 1999; Hutinger, 1996; Hutinger & Clark, 2000; Hutinger & Johanson, 1998; Hutinger & Johanson, 2000; Parette & Murdick, 1998; Speigel-McGill,

Zippiroli, & Mistrett, 1989). Computers and adaptive devices assist children with disabilities to participate in the activities of daily life and to do many of the same things other children do—draw pictures, play games, and communicate.

Adding technology tool applications to an array of children's educational experiences enhances access, learning, attention, communication, and social skills (Casey, 1997; Hutinger et al., 1998; Pressman, 1999). Moreover, computers may help children learn in new ways. Used appropriately, computers are valuable learning tools for preschool children (Haugland, 2000). The Center's experience in research, model development, and product development demonstrates that young children with a wide range of disabilities can not only use technology, but many of them use it easily and effectively, and retain elements of software use over a period of time (Hutinger, Clark & Johanson, 2001; Hutinger & Johanson, 2000; Hutinger, Johanson & Rippey, 2000; Hutinger, 1996; Hutinger & Bell, 1997; Perry, Ward, & Hutinger, 1987).

Assistive technology equalizes learning opportunities for children with mild to severe disabilities (Hasselbring & Glaser, 2000; Higgins & Boone, 1997; Hutinger, 1996; Lewis, 2000; Lewis, Ashton, Haapa, Kieley, & Fielden, 1998/1999; Lewis, Graves, Ashton, & Kieley, 1998). Equity in opportunity means that children with disabilities can achieve outcomes expected of *all* children. However, children who rely on assistive technology need technology-trained teachers and service providers (ISBE, 1996; Judge, 2001). EC-TIIS' nine workshops respond to that need.

Need for Technology Training

Technology has changed the way people give and receive information in all aspects of society, a reality that can affect training opportunities for early childhood personnel who work with children with disabilities, or those at risk, and their families. The need for the educational system to include technology and make dramatic and timely changes is great so that *all* children

can keep pace with technological and societal changes. But without well-trained teachers and staff, the need cannot be met.

Training teachers to use technology is a matter of considerable national concern. Successful technology integration is dependent on teachers' comfort levels and knowledge of technology. When teachers are uncomfortable with technology and its use, technology's impact on the curriculum will not be effective (Smith & Jones, 1999; Merbler, Hadadian, & Ulman, 1999; Schlosser, McGhie-Richmon, & Blackstien-Adler, 2000). In order to apply technology to positively impact children's learning, teachers say they must be trained in the use of different technologies as well as given strategies for integrating those technologies into the curriculum (Maeers, Browne, & Cooper, 2000; Schlosser, McGhie-Richmon, & Blackstien-Adler, 2000; Sianjina, 2000; Vannatta, 2000).

Barriers to technology use—lack of training, inadequate funding, failure to acknowledge technology as a relevant issue, or disbelief that technology can positively impact young children with disabilities—often prevail among many disciplines important to early childhood teams (Healy, 1998; Hutinger, et al., 1994; Pressman, 1999). The Division of Early Childhood (DEC) (Sandall, McLean, & Smith, 2000) recommends that technology training and technical assistance be available to support teachers. However, such training and support are severely lacking. One study reported that only 1 in 5 teachers felt 'very well prepared' to integrate technology (NCES, 1999), while another found that only 29% of teachers reported having 5 hours or more of curriculum integration training in the last year (Fatemi, 1999). EC-TIIS helps bridge the gap between need for technology training and access to such training by using a constructivist approach to learning that incorporates synchronous, as well as asynchronous, web-based instructional design. The nature of online learning provides an attractive option to people who

are busy with daily schedules —families, teachers, administrators, and others—in different locations and time zones.

Description of the EC-TIIS Website

The EC-TIIS website <www.wiu.edu/ectiis/> contains nine workshops, along with resources related to assistive technology and early childhood, and information about the project. Workshop topics include *Adaptations; Computer Environment; Curriculum Integration; Emergent Literacy; Expressive Arts; Family Participation; Math, Science, and Social Studies; Software Evaluation;* and *Technology Assessment*. See Figure 1 for Workshop Descriptions and the Appendix for sample Workshop pages. Content is based on the Center's curricula and training materials and includes written text, photos of children engaged in technology activities with some using adaptive devices, PDF (portable document format) files with further information, curriculum ideas and activities, resources, and related articles.

The EC-TIIS website was designed to be an information-intensive, attractive, comprehensive website with an intuitive user interface and navigation system. The site uses high contrast graphics for easy viewing. Through the use of externally imported style sheets, variable width pages, and minimalist design, the content of the site is fast loading even on slower dial-up systems. The average total page weight is approximately 25k. The website validates for HTML 4.01 W3C DTD guidelines, meeting accessibility requirements.

EC-TIIS website opens with a colorful splash page containing a collage of photographs of young children using technology with an introductory statement and link to the Center website under the graphic. A menu bar appears at the bottom of the page with links to Login, Register, Workshops, Resources, Products, About EC-TIIS, Contact Us, Center for Best Practices, Our Mission, and a Site Map. Each workshop contains a navigation bar at the top for easy access to other parts of the website.

Figure 1. EC-TIIS Workshop Descriptions

Adaptations
The Adaptations Workshop has information and resources on a variety of adaptive input methods as well as portable communication devices and customized activities for young children.

Computer Environment
The Computer Environment Workshop includes strategies for designing and adapting the physical environment, a checklist of considerations for setting up the computer center, and ideas for managing computer time.

Curriculum Integration
The Curriculum Integration Workshop contains ideas for integrating technology into the early childhood curriculum, activity planning information, and a wide variety of classroom examples.

Emergent Literacy
The Emergent Literacy Workshop focuses on curriculum applications, adaptations, and assessment techniques for using technology to support emergent literacy development in young children.

Expressive Arts
The Expressive Arts Workshop highlights techniques for incorporating technology into expressive arts for young children, including environmental design considerations, curriculum activities, and adaptations.

Family Participation
The Family Participation Workshop contains information on levels of family participation, workshop strategies, and resources to assist families in using technology with their young children.

Math, Science, & Social Studies
This workshop emphasizes strategies for designing computer activities, off-computer materials, and adaptations to engage young children in the learning process and help them meet early learning standards.

Software Evaluation
The Software Evaluation Workshop provides guidelines for selecting developmentally appropriate software, as well as evaluation factors, software classifications, and software suggestions for classroom themes and children's learning preferences.

Technology Assessment
The Technology Assessment Workshop contains procedures for using a team process to assess the technology needs of young children with moderate to severe disabilities. Techniques for making equipment, software, and activity recommendations are included.

To view Workshops, participants must first register, using the online Registration Form. The form provides EC-TIIS staff with user information such as name, address, e-mail, how the user found the site, the research group to which the user belongs, and what workshops are of interest to the user. After registering, participants can view workshops at any time by logging into the site with their User Name and Password. A Progress Page which lists the workshops and the user's completion of pre and post assessments is created for each participant. Users are asked to complete an online Workshop Evaluation upon exiting each workshop.

Description of Participants

The intended audience for the EC-TIIS website is early childhood teachers, program assistants, therapists and other support staff, administrators, families, and university faculty and students. During website development, selected participants were asked to provide feedback on content, navigation, and usability. At the beginning of the project, participants included those from four field test sites, located at the University of Kentucky, University of Montana, the Center for Assistive Technology at University of Buffalo, and Western Illinois University, and eight Advisory Panel members including professionals and family members from four states. By Year 2, four Advisory Panel members were no longer able to participate in EC-TIIS due to changes in professional or home life or poor health. After field testing, the website was opened for access by anyone interested in early childhood and assistive technology.

Problems and Resolutions

EC-TIIS staff experienced one main problem related to time expenditure in the web development process. The work involved in designing and developing the website took longer than originally anticipated. Decisions on format and design features took staff several months to finalize. Although content for the site was based on products and training materials already

developed at the Center, it took an unexpectedly long amount of time to organize the materials and get them into a web-based format. Staff also spent time formatting and preparing graphics for the workshops. Despite the enormous time expenditure, staff were able to complete the website and give field test sites enough time to review the site before the end of Year 2.

Evaluation

EC-TIIS website evaluation is based on data collected through online Workshop Evaluation forms at the end of each workshop. As the website was developed, Advisory Panel members reviewed the content and design features of the site and completed the online forms. Complete sets of data from six members were collected, analyzed, and summarized. Each reviewer rated the appearance, navigation, and content of the workshops indicating Strongly Agree, Agree, Disagree, or Strongly Disagree for each item. Reviewers were given eight statements to consider on Appearance and Content of the Site, and six statements on Navigation. The evaluations and comments were reviewed and summarized.

Evaluation results on the Appearance of the Site show that the site's graphics and design received high ratings. All six reviewers strongly agreed that the *Graphics are fast loading*. Seventy-eight percent strongly agreed that the *Graphic content is appropriate to site*. Sixty-seven percent agreed that *Graphics complement content*. Other statements receiving high strongly agree ratings include *Site is user friendly* (67%); and *Graphic design is appealing* (55%). Items receiving lower ratings were those related to planning of text for reading and printing and the readability of tables or lists, with each item receiving a 44% disagree rating.

Evaluation results on the Navigation of the Site indicate overall high ratings on six items. Eighty-nine percent of reviewers strongly agreed that *Site map is easy to find*, and 67% agreed that the *Site is easy to navigate*. When asked whether *Headings are descriptive of content*, 78%

strongly agreed. Two items relating to links received lower numbers of strongly agree ratings, with 44% for *Links work* and 33% for *Links are easily identified and clearly labeled*. Whether links work or not at any particular time is not always a reflection on the quality of the website since websites come and go and URLs change constantly. Therefore, EC-TIIS staff review links and search for updated ones on an ongoing basis.

Evaluation results on Website Content indicate that at least 67% of the reviewers strongly agreed on each of the eight statements. The highest rated item was *Workshop meets the needs of the targeted audience* with 89% strongly agreeing. Seventy-eight percent strongly agreed on five items including *Workshop content addresses the topics thoroughly*; *Information is presented objectively*; *Materials are current*; *Terminology is current*; and *Resource links are relevant.* Sixty-seven percent strongly agreed that *The content reflects developmentally appropriate practice*; and *Information is organized effectively*.

Overall comments on the website focus mainly on adding more graphics to the site, particularly in the Adaptations Workshop and the Computer Environment Workshop. One reviewer gave suggestions for making the pages easier to read and another reviewer suggested adding child case study examples to each workshop as an interactive component in which participants decide on the child's needs. Revisions were made to the site based on evaluation data and suggestions.

Project Impact

EC-TIIS staff participated in many dissemination activities during the 2 years of the Project. Staff provided information on the EC-TIIS website during presentations at five international, three regional, and five state conferences, with five presentations focusing exclusively on the website and online assistive technology training. Thirty-four educators and

families contacted staff to request participation information as a result of conference presentations. Two field test sites for the next phase of EC-TIIS were established from contacts made during these conferences.

Staff also disseminated information through a brochure developed in Year 2. The brochure describes the website and the online workshops, then provides registration information. Over 500 brochures were disseminated to conference participants, and persons requesting information through the website. After large distributions of the brochure, staff noted increased registration activity on the website.

Future Activities

The Center received funding in October 2002 to research the effectiveness of the EC-TIIS online workshops for educators, families, and university faculty and students in a Steppingstones Phase 2 Project. During the first year, a major site redesign occurred which involved creation and implementation of a PHP (Pre-Hypertext Preprocessor) run user authentication system. The site now includes login and password creation and session updating. Data collection forms in PHP were created for participant registration, online surveys, pre- and post workshop assessments, and site evaluation. The forms write directly to a MySQL database, which is downloaded in a format ready for import into SPSS, Statistical Package for Social Sciences, a statistical analysis program.

Four groups are participating in the research phase. They include Head Start educators, preschool special educators, families of children in Head Start and preschool special education, and university faculty and students. Participating universities include University of Tennessee, University of Montana, Western Illinois University, and State University of New York at Buffalo. To date, 91 educators, families, and university faculty and students have participated in

the online workshops. Besides collecting online data, EC-TIIS staff will review data from other measures, including interviews, action plans, child products, videos, digital pictures, Workshop Performance Indicators, and Interesting Incident Reports. The Center intends to submit a Steppingstones Phase 3 proposal to conduct further research on EC-TIIS in multiple settings with larger samples.

Assurance Statement

Two copies of this report have been sent to the United States Department of Education. One copy of the report has been sent to ERIC, and another has been sent to NECTAC as directed in the instructions.

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