Effectiveness of Online Workshops for Increasing Participants' Technology Knowledge, Attitude, and Skills: A Final Report of the Early Childhood Technology Integrated Instructional System – Phase 2

by

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IDEAs that Work
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Executive Summary

The Early Childhood Technology Integrated Instructional System (EC-TIIS 2), a Steppingstones of Technology Innovation Phase 2 Project, was implemented by staff at the Center for Best Practices in Early Childhood in the College of Education and Human Services at Western Illinois University in Macomb, Illinois. The EC-TIIS website <www.wiu.edu/ectiis/> was developed during a Phase 1 Steppingstones project as a unique teaching/learning website that combined training content from the Center's tested, effective early childhood technology-related projects into a series of nine workshops. EC-TIIS 2 was designed to refine the workshops and test the website's feasibility as a training tool for improving adults' technology knowledge and skills, thereby improving educational results of young children from 3 to 8 with disabilities by providing them with the means to access and participate in the general curriculum.

EC-TIIS 2 participants consisted of four groups including two groups of educators and support staff from Head Start programs and early childhood special education programs; families of children with disabilities and at risk in early childhood programs; and faculty and both preservice and graduate students in Early Childhood, Special Education, and Instructional Technology programs at universities and community colleges. During the project's 2 years, 415 individuals from 33 states and 15 countries registered on EC-TIIS website.

Quantitative (QUAN) and qualitative (QUAL) data were collected through online surveys and assessments available at the website. Additional QUAL data were collected through questionnaires sent by e-mail to educators and faculty or by direct distribution to university students. EC-TIIS staff established an online data collection system to retrieve and analyze data.

Results of EC-TIIS 2 demonstrate attainment of the study's research goals and the effectiveness of the workshops on the use of technology with young children with disabilities. Data results from surveys and workshop pre and post assessments indicate that EC-TIIS online workshops were effective in increasing knowledge of, positive attitudes toward, and skill in using technologies in the early childhood environment. An analysis of the nine sets of pre and post assessments showed statistical significance for a

majority of the items. As a result of knowledge gained in EC-TIIS workshops, educators made changes in their classrooms, including making materials and equipment more accessible to children, designing the computer environment more appropriately, and integrating a sign-up sheet strategy at the computer. Early childhood staff also credited their participation in EC-TIIS for the many positive outcomes children in their classrooms experienced from using technology and assistive technology.

The findings of EC-TIIS 2 provide evidence on the effectiveness of web-based training as a tool for educators and families in advancing educational opportunities for young children with disabilities. The resulting product and procedures will add valuable information to the field of early childhood technology as well as to the research on online data collection methods.

EC-TIIS 2 staff impacted over 2500 educators and families with information on the EC-TIIS website and research results through dissemination activities, including international, national, regional, state, and local conference presentations and exhibits and postings on listservs and websites. Research on the effects of EC-TIIS on educators, families, university faculty, and both preservice and graduate students continues in Phase 3.

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The Early Childhood Technology Integrated Instructional System 2 (EC-TIIS 2), housed in the Center for Best Practices in Early Childhood (the Center) within the College of Education and Human Services (COEHS) at Western Illinois University (WIU), was funded in 2002 by the U.S. Department of Education's Office of Special Education Programs (OSEP) as a two-year Steppingstones of Technology Innovation Phase 2 Project. EC-TIIS 2's goal was to test and further refine the web-based training developed during EC-TIIS 1* (Hutinger, Robinson, & Schneider, 2004), ultimately providing a website that is easy for educators and families to use and that contains information leading to improved technology services for young children. The EC-TIIS site is a unique teaching/learning website that combines training content from *Ideas That Work*—the Center's OSEP-funded, tested and effective early childhood technology-related projects—into a series of nine workshops designed to provide technology knowledge and skills. EC-TIIS 2 was designed to test and refine a technology-based approach and test its feasibility for (1) improving the results of education of young children from 3 to 8 with disabilities and (2) improving access to and participation in the general curriculum.

Goals and Objectives

EC-TIIS 2 had five research goals that focused on describing and explaining the effects of EC-TIIS on staff, families, faculty, and students, and ultimately what occurs in classrooms for young children with disabilities. The goals include:

1) Determine how EC-TIIS advances the availability, quality, use, and effectiveness of technologies in early childhood environments.
2) Describe and explain how participating in EC-TIIS effects classroom technology applications and integration of the knowledge and skills acquired by workshop participants.

* The Early Childhood Technology Integrated Instructional System, Phase 1 (EC-TIIS 1) PR#H327A000000071

3) Describe and explain how implementing the knowledge and skills acquired in the EC-TIIS workshops affects children's access to and use of technologies, as well as their behaviors.
4) Describe and explain the interactions among and between Goals 1, 2, and 3.
5) Analyze and explain the benefits of using EC-TIIS and the difficulties encountered in using it, together with any negative effects.

Objectives to meet these goals included 1.0 *Accomplish project start-up and management activities*; 2.0 *Develop and revise measures for assessing effectiveness of EC-TIIS 2*; 3.0 *Implement research plan*; 4.0 *Collect, analyze, and summarize data to determine effectiveness of EC-TIIS online workshops*; 5.0 *Refine EC-TIIS website and training content based on results of data analysis*; and 6.0 *Disseminate information on EC-TIIS to a broad audience*. Progress toward meeting these goals and objectives is addressed throughout this report.

Theoretical Framework

Legislation, research, and practice support access to technology by young children with disabilities. Yet 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 (Barnett, 2001; Healy, 1998; Hutinger, Hall, Johanson, Robinson, Stoneburner, & Wisslead, 1994; Pressman, 1999).

Children and Technologies

Technologies serve a variety of *purposes* and *functions* as educational tools for young children, depending upon the versatility of a particular application. In the best of scenarios, technology not only provides a way for children to *do things differently* (i.e., communicate, draw, write), but also enables them to *do different things* (e.g., make and use individualized multimedia software or establish a web site) (Bell, Clark, & Johanson, 1998; Hutinger & Clark, 2000; Hutinger, Clark, & Johanson, 2001; Hutinger, Beard, Bell, Bond, Robinson, Schneider, & Terry, 2001). Children's capabilities range from simple experiences (touching a key or switch) with immediate consequences to more complex experiences with interactive multimedia activities.

Used appropriately, computers are valuable learning tools for children (Haugland, 2000). Intervening with computers and other technologies, including adaptive peripheral devices or specialized software, produces positive changes in young children (Derer, Polsgrove & Reith, 1996; Hutinger & Johanson, 2000; Hutinger, Johanson, & Stoneburner, 1996; *Promising Practices,* 2000). Moreover, computers may help children learn in new ways (Bransford, Brown, & Cocking, 2000). A single computer can be used by an individual child, two or three children, or a larger group of children, thereby leading to increased positive social interactions (Buckleitner, 1994; Haugland, 2000; Hutinger, 1987, 1998, 1999; Hutinger, Bell, Beard, Bond, Johanson, & Terry, 1998; Hutinger, Betz, Johanson, & Clark, 2003; Hutinger & Clark, 2000; Hutinger, Johanson, & Rippey, 2000).

Using appropriate software can help children develop critical thinking, problem solving, creativity, and mathematical thinking (Clements, 1999a, 1999b; NAEYC, 1996). Software appeals to the wide range of children's abilities and learning styles and can be classified according to five levels of interactivity based on the degree of choice and control the child has over input, software paths, and events (Hutinger & Johanson, 1998; Robinson, 2003a).

Using technology, educators and families can document learning and enhance activities for young children. Digital cameras, video cameras, scanners, and the Internet can be used to collect images for use in tool software. Children can take digital photos or scan photos, drawings, pictures and 3-dimensional objects and transfer them to a computer. Children and adults together can develop individualized software using *BuildAbility, HyperStudio,* or *IntelliPics Studio,* authoring software that incorporates drawings, videotape, sound, animation, and text (Bell, Clark, & Johanson, 1998; Hutinger, et al., 2001; Robinson, 2003b).

While educational reforms emphasize computer-based instructional technologies, the emphasis is on elementary, middle school, and high school rather than on early childhood programs. However, research and practical experience indicate that young children who have experiences with technologies can participate more fully in the regular curriculum and are less likely to be left behind than those without such access (Lewis, 2000; Lewis, Ashton, Haapa, Kieley, & Fielden, 1998/1999). The Center's experience in research, model development, and product development demonstrates not only that young children with a wide range of disabilities can use technology, but also that many of them use it easily and effectively, and retain elements of software use over time (Hutinger, Bell, Johanson, & McGruder, 2002; Hutinger, Betz, Johanson, & Clark, 2003; Hutinger & Clark, 2000; Hutinger & Johanson, 2000; Hutinger, Johanson & Rippey, 2000).

Assistive technology equalizes learning opportunities for children with mild to severe disabilities. However, technology training for early childhood staff and families is essential if the goal of participation in the regular curriculum is to be met. If teachers and families are without appropriate knowledge and skills to integrate technology into early childhood curricular experiences, children's potential will remain untapped.

Training

Lack of training remains a major issue. Angeles and colleagues (2000) found that only half of teachers with technology in their classrooms use it for instructional purposes. In order to apply and impact children’s learning, teachers report that they must be trained in the use of different technologies and strategies to integrate those technologies into the curriculum (Berard, 2004; Judge, 2001; Maeers, Browne, & Cooper, 2000; Sianjina, 2000; Vannatta, 2000). Teachers cite lack of time and lack of information about where to obtain training as primary reasons for failing to use technology to its full extent (Judge, 2001).

The success of integrating technology into classrooms is limited by teachers’ comfort levels and knowledge of technology. The more training teachers have, the more benefits they see in using technology with their students (Rother, 2003). When teachers are uncomfortable with technology and its use, the impact on the curriculum will not be effective (Merbler, Hadadian, & Ulman, 1999; Schlosser, McGhie-Richmon, & Blackstien-Adler, 2000).

For many reasons, early childhood teachers have been slow to incorporate developmentally appropriate software, hardware, and adaptive devices into curriculum for young children. One major reason is that training to use technology with children is limited. The need is great to include technology across the educational community and make dramatic and timely changes so that *all* children can keep pace with technological and societal changes. However, without well-trained teachers and staff, the need cannot be met. Results of EC-TIIS 2 indicate that those who complete the workshops increase knowledge and skills related to specific technology applications in the regular early childhood curriculum and demonstrate increased positive attitudes toward technology use with young children.

Feasibility and Importance of Web-based Instruction for Adult Learners

Web-based instruction uses an approach to learning that is appealing to busy people and meets the needs of 21st century learners by allowing them any-time access to learning materials. Online courses are convenient because learners are not constrained by geographic location or confined to a set hour for participation (Butler, 2003; Mariani, 2001).

Researchers found no significant differences between web-based courses and traditional courses at the university level (Coppola & Thomas, 2000; Faux & Black-Hugh, 2000; Kubala, 1998; Phipps & Merisotis, 1999; Ryan, 2000; Schulman & Sims, 1999; Shoech, 2000; Teh, 1999; Wade, 1999). Draves (2000) reports that more interaction occurs both between the teacher and students and among students with online learning. The increased interaction may be due to students feeling more at ease to ask questions and participate in discussions when in front of a computer screen than when in a classroom. Students in some web-based learning environments achieve at higher rates than do their peers in traditional classroom settings (Thirunarayanan & Perez-Prado, 2002).

According to Butler (2003), other advantages include flexibility, availability, time savings, and no interruption to job. Web technology enhances adult learning with its 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 collaborative and constructivist learning (Burge, 1994; Cahoon, 1998; Eastmond, 1998; Field, 1997; Horton, 2000).

A constructivist approach to learning assumes that knowledge acquisition and exchange is a *learning process*. Learners "construct" models of the environment, then integrate and interpret new experiences and information based on their pre-existing knowledge, beliefs, and personal experiences (Abbott & Ryan, 1999; Anderson, 1996; Bransford, Brown, & Cocking, 2000; Hutchinson, 1995; Kamii & Ewing, 1996; Oliver, 2000; von Glaserfeld, 1995; Wilson & Lowry, 2000). The metaphors of building and shaping suggested by the constructivist model provide a framework for viewing effective staff and family development and a rationale supporting the flexibility and activities built into EC-TIIS web site.

Description of the EC-TIIS Website

EC-TIIS website (www.wiu.edu/ectiis/) contains nine workshops, 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, and PDF (portable document format) files with further information, curriculum ideas, activities, resources, and related articles.

Appearance

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 average total page weight is kept low, approximately 25k, which means the content of the site is fast loading even on slower dial-up systems.

EC-TIIS website opens with a colorful splash page containing a collage of photographs of young children using technology. An introductory statement and link to the Center website are under the graphic. The right side bar menu contains links to About Us, Contact Info, FAQ (Frequently Asked Questions), Glossary, Login, Products, Register, Resources, and Sample Workshops. Each workshop contains a top navigation bar for easy access to other parts of the website**.** 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 completing the Registration Form, the user is required to complete a Technology Survey and either the Classroom or Family survey, depending on which group the user identified on the Registration form. (Faculty and Student Surveys were added in Phase 3.*)

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, and Social Studies
The Math, Science, and Social Studies 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, classifying and evaluating children’s software, and suggests software for supporting classroom themes and children’s learning preferences.

Technology Assessment
The Technology Assessment Workshop contains procedures for using a team process to assess a young child’s technology needs and techniques for making equipment, software, and activity recommendations.

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* EC-TIIS was funded as a Steppingstones Phase 3 project in October 2004, focusing on research with more extensive groups. Throughout this report, the project is referred to as EC-TIIS 3 or Phase 3.

Users are asked, but not required, to complete a Pre-Assessment before entering a specific workshop. (A revision was made to this procedure in EC-TIIS 3, making pre-assessment completion mandatory.) After completing the registration process, participants can then view workshops at any time by logging into the site with their User Name and Password. A Progress Page listing 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 the website.

Accessibility

The website validates for HTML 4.01 W3C DTD guidelines, meeting accessibility requirements. EC-TIIS Webmaster uses the Web Accessibility 101 Policy, Standards and Design Techniques from University of Wisconsin-Madison, which is also used by Western Illinois University as a guideline.

The EC-TIIS website contains the following accessibility features:

- High contrast graphics – >90% color difference
- Level headings – text readers can jump from one heading to another
- Alt tags on all images – image is put into words by text reader
- Minimum use of tables throughout site
- Standard (o) tags appear as anchor at top left on each page – eliminates text reader from having to read top of each page (info that repeats). Text reader can skip standard or repetitive navigation links and jump to main content of the page. This is required in Section 508 – Standard (o)
- No image maps used
- Text description for every link
- Clarity of hypertext links [are underlined, clearly labeled]
- Minimum use of scripts
- No frames
- External cascading style sheets
- Relative sizes on fonts
- Relative table size – web page adjusts to size of user's monitor
- Labels on form elements, allowing for tabbed navigation without use of mouse to complete forms

Advisory Panel Feedback

Data on the EC-TIIS website content and design revisions were collected, analyzed, and summarized. In February 2003 six Advisory Panel members reviewed the web site and completed the online Workshop

Evaluation at the end of each workshop. Each reviewer used a Likert scale to rate 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.

Evaluation results on the Appearance of the Site showed that statements concerning the graphics and design of the site 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 44% disagreed rating.

Evaluation results on the Navigation of the Site indicated 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 agreed 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, but indicates the changing nature of the Internet. Staff reviewed links and searched for updated ones on an ongoing basis.

Evaluation results on Website Content indicated 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 critical feedback on the website mainly focused 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 website based on the reviewers' input.

Revisions. The EC-TIIS Web Developer made revisions to the design of the website during Phase 2 as a result of feedback from Advisory Panel members and Center staff members. The splash page, which originally contained a part of the Center logo, was changed to feature the current collage of children's pictures that portray assistive technology use. Color codes were added to the workshop menu page and color was coordinated throughout the website. Revisions continued throughout Year 2 as feedback was received from research sites and the Advisory Panel. Anyone who registers and reviews a workshop is asked to complete an online Workshop Evaluation. As a result, the Project receives ongoing feedback from users throughout the country.

EC-TIIS Participants

Targeted Audience

The intended audiences for the EC-TIIS website are early childhood teachers, program assistants, therapists and other support staff, administrators, families, and university faculty and students. EC-TIIS 1 participants included 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. Twelve Advisory Panel members included professionals and family members from four states. The same Advisory Panel members provided feedback on measures developed in Phase 2. The Phase 2 website was opened for access by anyone interested in early childhood and assistive technology.

Phase 2 Research Participants

EC-TIIS 2 research implementation included participation by four invited groups. Group 1 was comprised of Head Start classroom staff in East Peoria, Moline, Silvis, Kewanee, and Aledo, Illinois. Group 2 included families of children with disabilities and at risk in early childhood programs in Groups 1 and 3. Group 3 included early childhood program staff including regular and special education early childhood professionals and related service providers serving children three to five with disabilities or at risk. The original plan targeted a sample of 150 teachers from Hawaii for Group 3. Group 4 consisted of students in pre-service coursework in four universities (University of Buffalo, University of Montana, University of Tennessee; and Western Illinois University). Although early childhood staff, families, and university students from each of the invited groups did participate in EC-TIIS, the numbers were lower than originally planned due to staff turnover, lack of time commitment, and lack of professional development credit incentives offered by EC-TIIS. Some of the invited groups did not understand the research aspect of the Project and anticipated a final product with no data commitment upon enrollment. Further discussion of these issues can be found in the Lessons Learned and Problems Resolved section on pages 39-42. Since EC-TIIS is open to the public, many educators, families, and faculty who were not part of the invited groups, ended up comprising part of the research groups. For example, faculty at Eastern Michigan University and Lincoln Christian College became part of Group 4.

Method

All quantitative (QUAN) data and some qualitative (QUAL) data were collected through online surveys and assessments available at the EC-TIIS website. Additional QUAL data was collected through questionnaires sent by e-mail to educators and faculty or by direct distribution to university students.

Data Measures and Schedule

At the beginning of the second phase of EC-TIIS, project staff developed online measures to collect data from the four study groups, which included Head Start educators, preschool special educators, families from Head Start and special education groups, and university faculty and students. Measures were designed specifically for each group. Before entering any of the online workshops, participants were required to complete *Registration*, the *Technology Survey*, and one other survey depending on the group to which they belonged. At the beginning of Year 2, all measures were online and accessible to participants. A description of each measure follows:

Registration. New users of the EC-TIIS site complete a *Registration* form. The form consists of 10 items including required personal information such as name, address, e-mail address, and current position. Three optional questions relate to gender, age, and race. Two other items ask how the user found the EC-

TIIS website and what kind of information interests the user.

Technology Survey. The *Technology Survey* is completed by all participants during their initial registration process on the website. The survey contains 21 items related to participant's computer use and skills, Internet use, and experience with adaptive devices.

Classroom Use of Technology. This pre and post measure is completed by all educators at the beginning of participation in EC-TIIS and a year following completion of the online workshops. The questionnaire is divided into two parts. Part 1 contains 20 items which focus on the use of technology in the curriculum. Participants are asked the type of equipment available and how it is integrated into the curriculum. Part 2 contains 11 items about children's use of technology. Questions include what technologies the children use, how much time they spend on the computer each week, what software they prefer and what gains the children have made.

Family Use of Technology. This pre and post measure is completed by all families at the beginning of their participation in EC-TIIS and a year following completion of one of the online workshops. The questionnaire contains 11 items including what technologies and software are in the home, favorite software used by the child, adaptive equipment used outside of school, and how the child uses the computer at home.

Faculty Questionnaire. This three-item questionnaire is sent via e-mail to faculty members who have used EC-TIIS workshops in at least one of their courses. Faculty are asked to list benefits for their students and themselves that resulted from using the workshops; to describe their plans for using the workshops in other courses; and to make recommendations for other faculty who want to use the online workshops.

Undergraduate Student Questionnaire. This questionnaire is sent via e-mail or distributed in class to university students who have used at least one EC-TIIS workshop as part of coursework. Students are asked two questions related to benefits or gains they received from participating in the online workshops and effects their participation will have on future teaching.

Graduate Student Questionnaire. This six-item questionnaire is sent via e-mail or distributed in class to graduate students in early childhood courses. Since these students were required to complete *Workshop*

Performance Indicators, one of the questions related to the amount of time the student spent on the workshops and the *Indicators*. Students were also to identify benefits or gains they received from participation in the workshops; to explain how workshop content was integrated into the curriculum and how participation has impacted children in their classroom; and to describe plans for using the workshops in the future.

Workshop Pre-Assessments and Post Assessments. Assessments are available online for each of the nine workshops as listed in Figure 1. Workshop assessments relate to a participant's knowledge, skills, and attitudes about the topic. Each pre-assessment contains up to 10 items, with at least three questions related to knowledge and skill and at least two related to attitude. Each workshop post-assessment contains the pre-assessment items and three items related to usefulness of the workshop. A copy of the *Emergent Literacy Workshop Post Assessment* is included in the Appendix.

Workshop Performance Indicators. A set of *Performance Indicators* is found at the end of each EC-TIIS workshop. The *Indicators* are suggested activities to test the participant's knowledge and application of workshop content. *Indicators* may be used as a requirement in coursework or for workshop professional development credit. Sample *Performance Indicators* are contained in the Appendix.

Data Collection

EC-TIIS staff collected both QUAN and QUAL data from online workshop participants. Staff developed the online data collection system during Year 1. Data collection began in August 2003 and continued throughout May 2005.

Online system. The EC-TIIS online data collection system was developed in three stages: (1) design of input pages consisting of 37 files; (2) coding of each file for database integration and PHP processing by the web server; and (3) creation of tables in the *MySQL* database. Web development tasks related to the three stages include:

- creating the surveys
- coding of surveys into html for user input
- backend program coding for PHP server interpretation of user
- registration, login, tracking, posting of survey results to the database

- real time updating of participant progress through the workshops
- backend creation and coding of the database for real time data
- retrieval, tracking, and posting to allow researchers to view a particular participant's progress through a web interface

The data retrieval process has real time access capability. Participants are able to access their own account to view their progress within their browser window. This process allows project staff to remind participants of any online measures that need to be completed.

Data Analysis

All data received online is formatted for direct retrieval to *SPSS* (*Statistical Package for Social Sciences*), a statistical analysis program. Analysis is then conducted according to the nature of the data. For each of the Workshop Assessments, all items were compared from pre to post using paired sample t-tests. Effect sizes were calculated for all comparisons. Confidence intervals were then determined for each effect size.

Results and Discussion

Data on Participants

As of May 31, 2005, 415 individuals registered on the EC-TIIS website, an increase of 166 or 40% from the previous year. The largest percentage of participants (53.7%) were located in Illinois (n=223). Michigan (n=26) and California (n=25) had the next highest percent of participants, 6.3 % and 6%, respectively. Thirty other states were represented, each having fewer than 5% of the total participants. See Table 1 for states with four or more participants.

Besides the United States, 14 other countries were represented. The United Kingdom had three participants (6.5% total), while the 13 other countries each had less than 5% of the total participants. Countries represented included Germany (military families), India, Vietnam, Barbados, China, Turkey, Butane, Thailand, Papua New Guinea, Canada, Nigeria, Malaysia, and New Zealand.

Table 1. State Locations of Participants

State	*n*	Percent
Illinois	223	53.7
Michigan	26	6.3
California	25	6.0
Tennessee	17	4.1
Iowa	13	3.1
Hawaii	9	2.2
Ohio	7	1.7
Texas	6	1.4
New Jersey	6	1.4
Massachusetts	6	1.4
Pennsylvania	5	1.2
Wisconsin	5	1.2
Kansas	4	1.0
New York	4	1.0

Participants' gender and age. Two optional items in Registration were gender and age. More females (*n*=364), 88%, than males (*n*=47) 11%, completed the surveys. Four individuals did not indicate their gender. Of the 415 participants, 143 (34.5%) did not provide their age. Of those who did, the age of the largest percent of participants was 20 (12.3%), then 21 (11.6%), 22 (5.5%), and followed by 23 (3.4%). The relatively high percent of registrants in their early 20's is explained by the fact that 50% of EC-TIIS participants are university students.

Participants' ethnicity. Another optional item on the survey was ethnicity. Although 415 people responded to this item, 107 (26%) of them indicated that their ethnicity is unknown. Most of the other 308 participants were Caucasian (*n*=266, 86%), followed by Hispanic (*n*=15, 5%), African American (*n*=13, 4%), Asian (*n*=9, 3%), and Pacific Rim (*n*=5, 2%).

Participants' positions. Of the 415 registrants 70 (17%) were Early Childhood Educators, 23 (6%) Early Childhood Special Educators, 10 (2%) Head Start teachers, 20 (5%) Pre-Kindergarten teachers, 3 (.5%) Program Assistants, 5 (.5%) Support Personnel, 19 (5%) Administrators, 20 (5%) university faculty, 203 (50%) university students, 8 (2%) family members, and 27 (7%) categorized themselves as 'Other'. Some participants marked more than one category.

Relationship with EC-TIIS. On the Registration Form participants identified what group best described their research relationship with EC-TIIS. Of the 415 survey participants, 235 (56.6%) indicated that they were university students. Of those identifying themselves as students, 166 are from Western Illinois University, 13 from the University of Tennessee and 55 from other universities not defined in the data. Forty-eight participants were Preschool Special Education teachers. Faculty were from three of our university groups and families were from two of the groups as shown in Table 2. Seventy-three participants did not fit into any of the predefined categories.

Table 2. Participants in EC-TIIS Groups

Participants	*n*	Percent
Faculty and Students		
Western Illinois University	166	40.0
Western Illinois University Faculty	4	1.0
University of Tennessee	13	3.1
University of Tennessee Faculty	1	.2
University of Montana Faculty	1	.2
Other University Faculty	23	5.5
Educators		
Preschool Special Educator	48	11.6
Tazewell-Woodford Counties Head Start	4	1.0
Project NOW Head Start	2	.5
Other Head Start Educators	17	4.1
Families		
Project NOW Head Start Family	1	.2
Hawaii Preschool Family	1	.2
Other Preschool Family	5	1.2
None of these Groups	73	17.6
Total	415	100.0

How participants found website. When asked the question, *Were you invited to participate in EC-TIIS by an administrator, teacher, or the EC-TIIS staff?* 277 out of 415 participants (67%) indicated that they were invited to view the EC-TIIS website. One hundred thirty-eight (33%) were not. However, when asked *How did you find EC-TIIS?*, 213 (51.3%) responded they were given the website address via an invitation, 83 (20%) selected other, 48 (11.6%) found the website through a search engine, 30 (7.2%) participated in a seminar or workshop where the site was recommended, 17 (4.1%) found it through the Center for Best Practices website, 17 (4.1%) because another website recommended it, and 7 (1.7%) saw the web site through an EC-TIIS Brochure.

Workshop selection. When asked to select all workshops which were of interest to them, participants selected Curriculum Integration (*n*=224, 54%) most often. Next was Emergent Literacy at (*n*=188, 45.3%), followed by Adaptations and Family (*n*=168, 40.5%), Software (*n*=141, 34%), Expressive Arts (*n*=138, 33.3%), Math Science Social Studies, (*n*=136, 32.8%), Technology Assessment at (*n*=132, 31.8%), Computer Environment at (*n*=108, 26%), and Other at (*n*=19, 4.6%).

Technology Survey Results

All participants were required to complete the *Technology Survey*. Each participant was asked to rate the following statement: *Technology is a valuable teaching and learning tool for young children*. Sixty-nine percent (*n*=288) agreed that technology is a valuable teaching and learning tool for young children, while 6% (*n*=24) disagreed with that statement. Twenty-five percent (*n*=104) had no opinion or did not respond to the question. In the data analysis, *No opinion* was collapsed with those who did not respond. *Strongly Agre*e and *Agree* were collapsed to *Agree*, while *Strongly Disagree* and *Disagree* were collapsed to *Disagree*.

Of the 415 participants 314 (75.7%) said they had access to a computer. The other 101 (24.3%) participants did not answer the question. Most of the participants had access to a computer at home (*n*=271, 65%), followed by the university (*n*=183, 44%), then the classroom (*n*=137, 33%), library (*n*=117, 28%), work (*n*=100, 24%), and other (*n*=11, 3%). Sixty-nine percent (*n*=286) had access to the Internet on a regular basis while 31% (*n*=129) failed to respond or selected *no*. The highest availability for Internet access was at home with 63% (*n* = 363) followed by the university (*n*=191, 46%), classroom (*n*=134, 32%), work (*n*=96, 23%), library (*n*=121, 29%) and other at 3% (*n*=13). Twenty-two percent (*n*=91) of the participants had experience using adaptive devices.

Participants indicated on the *Technology Survey* their specific computer skills related to a variety of applications, ranging from using word processing to creating websites to using personal PDAs (Personal Digital Assistants). Table 3 contains a summary of participants' responses.

Table 3. Participants' Computer Skills

Computer Skill	*n*	Percent
Creating word processing documents	293	71%
Sending or receiving attachments from email	281	68%
Using other computer applications	230	55%
Burning a CD	230	55%
Using a scanner	204	49%
Downloading digital picture from a camera	210	48%
Installing or removing applications from the computer	187	45%
Manipulating/altering digital pictures	186	45%
Creating a personal website	106	24%
Using a personal PDA	55	13%

Participants were asked, prior to accessing EC-TIIS workshops, if they needed more technology training. Of the 415 responses, 272 (65%) said yes, 36 (9%) said no, and 107 (26%) did not respond. The type of technology training that participants needed most was curriculum integration at 52% (*n*=216), followed by adaptations 41% (*n*=171), emergent literacy 36% (*n*=151), family participation 36% (*n*=150), software 36% (*n*=148), technology assessment 30% (*n*=124), math science and social studies 29% (*n*=122), expressive arts 28% (*n*=118) and computer environment 23% (*n*=94). Although the order of the workshops is slightly different, the number and percents are similar to responses on the workshop selection item on the *Registration* form (see page 20).

When asked about prior experience with online training, only 23% (*n*=97) of participants had taken an online course or workshop prior to registering for the EC-TIIS workshops. Fifty percent (*n*=207) said they had not previously participated in online workshops and 27% (*n*=111) did not respond. By collapsing *Some Experience* with *Average* and *Above Average* with *Highly Experienced*, data showed 47% (*n*=195) of the participants had above average experience in using the World Wide Web, while 27% (*n*=112) had average experience. One percent (*n*=4) had no experience and 25% (*n*=104) did not respond.

***Classroom Survey* Results**

The *Classroom Survey* was completed by 31 educators who responded to questions relating to their experience, the type of program they had, technologies available for their classroom, their use of technology with children, and children's use of technology. Analysis of the data indicate five preservice participants identified themselves as Educators, even though they were not yet teaching.

Teaching experience. Thirty-one teachers provided information on the number of years they have been teaching. Five had no experience teaching (16%), four had one year experience (13%), six had three to ten years (19%), seven had 11-15 years (22%), six had 16-20 years (19%), and three had 22-28 years experience (10%). The mean years of teaching was 10.45 years.

Type of program. Of the twenty-six educators who had teaching experience, 16 had all day programs, and 10 had half-day programs. The total number of children served by the teachers was 2,241, with 836 from 19 morning programs, 606 from 15 afternoon programs, and 799 from 14 all-day programs. The number of special needs children was 337, and the number of at-risk children was 664.

Technologies available in the classroom. On the *Classroom Survey* the teachers were asked*, What technologies are available for your classroom?* They could check all that applied. Of the 31 teachers who responded 30 of them have a Personal Digital Assistant (PDA) and a Web Cam, two newer pieces of equipment. Table 4 shows a listing of their responses.

Table 4. Technologies Available for Classroom (*N*=31)

Technology	*n*	Percent
Personal Digital Assistant	30	97
Web Cam	30	97
Other	28	90
CD Burner	27	87
Scanner	27	87
Computer	25	81
Printer	23	74
Electronic Learning Toy	22	71
Video Camera	22	71
Internet Access	21	68
Digital Camera	20	65

Even though teachers may have equipment available to them, EC-TIIS wanted to know what technologies they actually use within the curriculum. The most frequently checked item was Other, followed by a PDA and Web Cam. Table 5 contains a listing of participants' responses.

Table 5: Technologies Used Within Curriculum (*N*=31)

Technology	*n*	Percent
Other	30	97
Personal Digital Assistant	29	94
Web Cam	29	94
CD Burner	28	90
Scanner	26	84
Video Camera	26	84
Computer	23	74
Digital Camera	21	68
Printer	20	65
Electronic Learning Toys	20	65
Internet Access	18	58

Technology integration. Teachers were asked if they integrated technology with other types of activities in the classroom. Forty-five percent of the teachers (*n*=14) said they integrate technology, while 42% (*n*=13) indicated they did not. Thirteen percent (*n*=4) did not answer the question. On a related question, teachers were asked about their use of the Internet as a resource in the curriculum. Sixteen (52%) teachers use websites as teaching resources while eleven (35%) do not.

Software. Of the 15 teachers who responded to the question on number of adult software programs available to the classroom, the average was seven software programs per classroom. The average number of children's software for each classroom was 19.

Adaptive equipment. When asked about adaptive equipment in the classroom, 15 of the 31 teachers responded. Results are shown in Table 6. The adaptive mouse, switches, and the touch screen were used the most, while Discover: Kenx was not used in any of the classrooms.

Table 6. Adaptive Equipment (*N*=15)

Equipment	*n*	Percent
Adaptive Mouse	3	20
Switches	3	20
Touch Screen	3	20
Augmentative Communication Device	2	13
Switch Input Box	2	13
IntelliKeys	1	7
Discover Ke:nx	0	0
None/Other	0	0

Technology assessment. Teachers were asked if they had participated in a technology assessment for a child in their classroom. Seven teachers indicated that they had, while 18 had not participated in an assessment. Six teachers did not respond.

Computer use. In response to a question about when the computer was used in the classroom, most of the teachers (*n*=25) indicated that they used the computer during large group instruction. Since they could check more than one answer, other frequent responses included curriculum instruction (*n*=22), small group (*n*=20), center time (*n*=18), individual (*n*=18), and free play (*n*=17). *Other* and *None* were collapsed in the analysis, for a combined total of 59 responses. One of the teachers who selected *Other* provided this explanation, *The computer in our three-year-old classroom is used mainly for the teacher to research materials*. Another teacher explained, *Occasionally the computer is used for language experience dictation and making books with photos*. Another wrote, *After the children use it, I use it, of course*.

Technologies children use. A second part of the *Classroom Survey* addresses the children's use of technology. When asked what specific technologies children use in the classroom, 18 teachers responded that the computer is used by the children, with the digital camera, electronic learning toys, and the printer being used in fewer classrooms. Table 7 contains a summary of the responses.

Table 7. Technologies Used by Children (*N*=25)

Technology	*n*	Percent
Computer	18	72%
Digital Camera	8	32%
Electronic Learning Toys	8	32%
Printer	6	24%
CD Burner	1	4%
Internet Access	1	4%
Scanner	1	4%
Web Cam	1	4%
Other	1	4%
Personal Digital Assistant	0	0%
Video Camera	0	0%

Fifteen of the 31 respondents said they allow children in the classroom to independently handle software, while nine teachers did not allow children to handle software. Six teachers did not respond.

When asked how frequently the computer is used in a week, 13 of 26 teachers (50%) indicated the children used the computer daily, while three classrooms (11%) used it two to three days per week. Seven (27%) responded that the computer was used once a week or less. Three teachers (11%) responded that the children never used the computers.

Children's time on computer. Teachers were asked to provide the time children spent on the computer in the morning and afternoon each day. Data showed that children use the computer more in the morning than in the afternoon. The average time children spent at the computer in the morning is 20 minutes, while in the afternoon it is 12.5 minutes. See Table 8 for averages per day. The most popular day to use the computer (based on the number of minutes) is Tuesday.

Table 8. Average Classroom Time in Minutes That Children Spent at the Computer

Day of the Week	AM	PM
Monday	20	13
Tuesday	23	13
Wednesday	19	14
Thursday	21	13
Friday	17	10

When asked how children use the computer, whether alone or with others, results show 25% (*n*=7) of the teachers indicated children use the computer with one other child, 24% (*n*=6) use the computer with an adult, 22% (*n*=5) use the computer by themselves, and 11% (*n*=3) use the computer with two or more children.

Since EC-TIIS is interested in knowing how the computer is used by the children in the classroom, teachers were given statements concerning behaviors children may exhibit while at or near the computer. Teachers were asked to rate their level of agreements with the statements listed in Table 9, based on their observations of the children's computer use in the classroom. Twenty teachers responded to this item. The highest response was 85 % (*n*=17) on the item which states, *Children comprehend and respond to story based software* while at the computer. See Table 9 for responses to other items.

Table 9. Children's Computer Use (*N*=20)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Comprehend and respond to story based software	0	0	2	17	1
Gain meaning by listening to the story from the computer	0	2	2	14	2
Demonstrate awareness of computer rules and routines	1	1	2	13	3
Use the computer materials and equipment carefully	1	1	3	13	2
Show appreciation for stories and reading	0	0	3	12	5
Use the computer as a tool for investigation	1	4	1	10	4

Computer center. Of the 30 teachers that responded to the question on what children do at the computer center, 60% (*n*=18) noted that children explore programs and 57% (*n*=17) of the children interact with stories. See Table 10 for other responses.

Table 10. Child Activities At or Near Computer

Activity	*n*	Percent
Exploring Programs	18	60
Interacting with Stories	17	57
Problem Solving	14	47
Singing	11	37
Drawing	8	22
Printing	6	20
Dancing	4	13
Other	3	10

Fourteen of 27 teachers (52%) observed children making a connection between software content and curricular areas. Twenty teachers rated the popularity of the computer for children in their classroom. On a 5-point scale ranging from High to Low, none of the teachers rated it Low. When responses for 2 on the rating scale were collapsed with 3 and responses for 4 were collapsed with 5 in the analysis, data show 20% (*n*=4) of the teachers rated computer's popularity as Medium and 80% (*n*=16) rated it High.

Pre and Post Workshop Assessment Results

Participants were required to complete a pre-assessment containing items related to knowledge, skills, and attitudes before entering each workshop. They were asked to complete the online post assessment after they finished a workshop. The number of participants completing assessments varied with workshops.

For each of the workshops, all items were compared from pre to post using paired sample t-tests. Effect sizes were calculated for all comparisons as well as confidence intervals for each effect size. The findings across workshops consistently showed gains in self-reported knowledge, attitudes, and skills.

Adaptations Workshop. A total of 100 participants completed both the pre and post assessments for the Adaptations Workshop. Comparisons for all six items were statistically significant. Effect sizes of larger than 1 were found for all comparisons. The largest effect size was found for the knowledge item related to evaluating switch skills using the *Levels of Switch Progression*. See Table 11 on the following page for effect size on all Adaptation Workshop items.

Table 11. Adaptations Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know the similarities and differences between portable communication devices.	99	2.40	3.83	12.30[a]	1.57	(1.25,1.88)
I know how the computer can be made accessible for children with motor impairments.	100	2.94	4.26	10.02[a]	1.20	(.89,1.49)
I know how to evaluate a child's switch skills according to the *Levels of Switch Progression*.	98	1.69	3.57	15.90[a]	1.93	(1.58,2.26)
Attitude						
Any child can benefit from an alternate input.	99	3.21	4.35	9.50[a]	1.09	(.79,1.38)
Skills						
If needed, I could select an adaptive input device that is appropriate for an individual child.	98	2.18	3.86	15.88[a]	1.76	(1.42,2.08)
If needed, I could secure a switch in a stable position for a child.	98	2.15	3.98	14.17[a]	1.71	(1.38,2.03)

[a]$p<.001$

Computer Environment Workshop. A total of 90 participants completed both the pre and post assessments for the Computer Environment Workshop. Statistical significance was found for all seven items. Effect sizes ranged from .31 to 4.97. The effect size of .31 was found for the skill item related to evaluating a computer center. Participants reported high efficacy for this skill as demonstrated by a mean of 4.03 at pre. The effect size of 4.97 was found for the knowledge item related to setting up technology for independent access by children. Participants reported a mean of only 1.22 at pre. See Table 12 on the following page for further details.

Table 12. Computer Environment Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know how to set up the computer and software so that children can access them independently	90	1.22	4.32	31.80[a]	4.97	(4.36,5.54)
I know strategies to help encourage turn taking at the computer.	90	3.20	4.40	8.58[a]	1.22	(.90,1.54)
I know materials and resources needed to make off-computer props, which relate to software content.	88	3.51	3.95	3.21[b]	.46	(.16,.76)
Attitude						
Children's time at the computer should be carefully managed by an adult.	88	2.51	3.81	7.78[a]	1.11	(.79,1.42)
Children can learn to handle software and operate the computer independently.	89	3.58	4.39	5.50[a]	.83	(.52,1.14)
Skills						
I can evaluate a computer center for appropriate equipment placement and adaptations.	90	4.03	4.31	2.35[c]	.31	(.01,.60)
I can devise a method to make CD-ROMs easily accessible for children.	90	3.10	4.29	9.41[a]	1.22	(.90,1.53)

[a]$p<.001$, [b]$p<.01$, [c]$p<.05$

Curriculum Integration Workshop. A total of 47 participants completed the pre and post assessments for the Curriculum Integration Workshop. Statistical significance was found for all six items. Effect sizes ranged from .51 to 1.45. The smallest effect size was for the attitude item related to incorporating technology into the early childhood curriculum. The largest effect size was found for the knowledge item related to using technology in the preschool classroom. See Table 13 for effect sizes and mean scores.

Table 13. Curriculum Integration Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know what curriculum integration means in terms of using technology in the preschool classroom.	47	2.91	4.36	8.30[a]	1.45	(.98,1.89)
I know how to use technology to develop off computer materials that can be used to integrate children's software into my curriculum.	46	2.98	4.22	7.38[a]	1.31	(.85,1.75)
I know how to select appropriate software for use with thematic units.	47	2.98	3.98	6.33[a]	1.01	(.57,1.43)
Attitude						
Technology should be incorporated into the early childhood curriculum.	45	3.60	4.22	3.50[a]	.51	(.08,.92)
Skills						
I can develop a plan that contains elements recommended for technology integration activities.	46	2.83	4.07	8.28[a]	1.43	(.96,1.88)
I can integrate current ideas and materials into technology related activities in the classroom.	46	3.07	4.26	7.60[a]	1.29	(.83,1.72)

[a]$p<.001$

Emergent Literacy Workshop. A total of 70 participants completed both the pre and post assessments for the Emergent Literacy Workshop. Statistical significance was found for five of the six items as shown in Table 14. The lone item not to reach significance was the skill item that focused on designing a technology activity to promote emergent literacy. Not only did this item fail to reach statistical significance, the trend for this item showed a decrease in reported skill. One explanation for this finding is that participants underestimated the complexity of this task at pre. Effect sizes ranged from -.31 to 6.96. This large effect size was for the knowledge item related to assessing young children's emergent literacy skills.

Table 14. Emergent Literacy Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know techniques that can be used to assess young children's emergent literacy skills.	70	1.11	4.49	44.01[a]	6.96	(6.04,7.79)
I know how to adapt reading materials for a preschool child who has difficulty turning the pages of a book.	70	2.81	4.46	9.78[a]	1.74	(1.34,2.12)
Attitude						
A sign-up method should be used to manage turn-taking at the computer, as well as promoting emergent literacy skills.	70	2.59	4.69	15.02[a]	2.49	(2.04,2.92)
Using labels or environmental print in the classroom promotes emergent literacy.	69	4.07	4.75	4.69[a]	.81	(.46,1.15)
Skill						
I can design a technology curriculum activity to promote emergent literacy.	70	4.37	4.11	-1.87	-.31	(-.64,.03)
I can arrange the environment so that children have easy access to books and writing materials.	70	2.64	4.67	14.55[a]	2.41	(1.97,2.84)

[a]$p<.001$

Expressive Arts Workshop. A total of 47 participants completed both the pre and post assessments for the Expressive Arts Workshop. Statistical significance was obtained for eight of the nine items as shown in Table 15. The lone item that did not reach statistical significance was the attitude item related to the appropriateness of teacher-assisted activities for all children. This item was worded in such a way that Strongly Disagree would be the desired response. The effect sizes ranged from -.05 to 4.03. The largest effect size was related to knowing the developmental stages of art. Participants reported a low mean of 1.17 at pre.

Table 15. Expressive Arts Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know the developmental stages of art.	47	1.17	3.94	20.22[a]	4.03	(3.30,4.69)
I know how to determine and implement developmentally appropriate art activities into a program.	47	2.19	4.26	10.30[a]	2.19	(1.66,2.68)
I can recognize children's art at different developmental stages.	47	2.57	4.09	7.96[a]	1.56	(1.09,2.01)
I know some benefits for the visual arts in early intervention programs.	47	2.34	4.38	11.52[a]	2.16	(1.64,2.64)
Attitude						
Expressive arts offer important opportunities for expression, problem solving, and communication.	47	2.64	4.64	10.81[a]	2.12	(1.60,2.61)
Expressive arts contributes to healthy development and learning.	47	3.60	4.62	5.80[a]	1.09	(.65,1.51)
Expressive arts contributes to written and spoken communication and enhances social development.	47	3.77	4.57	5.72[a]	.86	(.43,1.27)
Teacher-assisted art activities are the most appropriate for all children in preschool.	46	3.65	3.59	-.24	-.05	(-.46,.36)
Skills						
I can plan appropriate child-directed activities in drawing and painting for children demonstrating different developmental levels.	46	2.61	4.28	6.65[a]	1.82	(1.32,2.29)
I can arrange the physical environment for drawing, painting, and three-dimensional activities.	47	2.51	4.43	9.30[a]	2.02	(1.51,2.50)

[a]$p<.001$

Family Participation Workshop. A total of 33 participants completed the pre and post surveys for the Family Participation workshop. Statistical significance was found for all seven items. Effect sizes ranged from .81 to 6.10. The smallest effect size was for the attitude item related to family members attending technology workshops. The largest effect size was found for the knowledge item related to the levels of family participation for early childhood activities. See Table 16.

Table 16. Family Participation Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know the levels of family participation for early childhood activities.	33	1.09	4.36	27.88[a]	6.10	(4.90,7.17)
I know several strategies to help increase family participation in preschool technology activities.	33	2.88	4.30	7.14[a]	1.63	(1.06,2.17)
I know the important points to consider in developing a newsletter that includes technology-related information.	33	2.76	4.15	6.84[a]	1.71	(1.13,2.25)
Attitude						
Family members can provide valuable input for their child's computer use at school even if they do not use a computer at home.	33	2.52	4.48	8.80[a]	2.09	(1.46,2.66)
Attending a technology workshop is the best way for families to learn about how computers can be used with their children.	31	3.68	4.32	3.53[a]	.81	(.28,1.32)
Skills						
I can plan and design a hands-on technology workshop for families of young children with disabilities.	33	3.24	3.94	3.73[a]	.91	(.39,1.41)
I can use a variety of techniques to evaluate family involvement in technology activities.	33	1.85	4.00	10.76[a]	2.53	(1.86,3.14)

[a]$p<.001$

Math, Science, and Social Studies Workshop. A total of 49 participants completed the pre and post assessments for the Math, Science, and Social Studies workshop. Statistical significance was found for six of the seven items as shown in Table 17. The lone item that did not reach significance was the skill item related to adapting computer activities to help promote early science skills. Participants felt efficacious at pre, resulting in a mean of 3.73.

Effect sizes ranged from .39 to 5.04. The largest effect size was for the knowledge item related to accessing published position statements on math, science, and social studies in early childhood education.

Table 17. Math, Science and Social Studies Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know how to access published position statements on math, science, and social studies in early childhood education.	49	1.08	4.12	26.10[a]	5.04	(4.19,5.80)
I know software programs that integrate social studies into the early childhood curriculum.	49	2.57	4.22	9.93[a]	1.74	(1.26,2.19)
I know strategies that promote children's problem solving skills at the computer.	49	2.55	4.18	11.50[a]	2.07	(1.56,2.54)
Attitude						
Good math software contains at least one drill and practice activity to help children with early number concepts.	48	2.81	3.81	6.03[a]	1.17	(.73,1.59)
Software that features a variety of cultures should be used to effectively teach young children about social studies.	49	2.98	4.29	8.15[a]	1.39	(.94,1.82)
Skills						
I can adapt a computer activity for a young child to help promote early science skills.	49	3.73	4.12	1.96	.39	(-.01,.78)
I can design curriculum activities using software and off-computer materials to promote children's knowledge about community helpers (e.g. fire fighters, police officers, EMTs, Doctors).	48	2.92	4.13	6.00[a]	1.24	(.79,1.67)

[a]$p<.001$

Software Evaluation Workshop. A total of 32 participants completed both the pre and post assessments for the Software Evaluation Workshop. Statistical significance was obtained for five of the eight items as shown in Table 18. The three items that did not reach significance included the skill item related to categorizing software based on the levels of interactivity and the two attitude items. All three of the items had a pre mean of 3.1 or higher. Effect sizes ranged from -.02 to 6.97. The largest effect size was found for the knowledge item related to features to consider when selecting software for children.

Table 18. Software Evaluation Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know what features to look for when selecting software for children.	32	1.16	4.50	28.97[a]	6.97	(5.60,8.18)
I know the levels of software interactivity.	32	3.34	4.28	5.59[a]	1.21	(.66,1.72)
I know a variety of ways that software can be used with children.	32	2.84	4.44	7.42[a]	1.82	(1.21,2.38)
I know the benefits of using software with children.	32	3.72	4.56	5.00[a]	1.16	(.62,1.68)
Skills						
I am able to categorize software based on the levels of interactivity.	32	3.97	4.28	1.97	.39	(-.11,.88)
I can effectively evaluate software for use with children.	32	2.91	4.44	6.69[a]	1.73	(1.13,2.28)
Attitude						
All software designed for children is beneficial.	31	3.58	3.55	-.12	-.02	(-.52,.47)
Software is most effective when children use it by themselves.	30	3.10	3.63	1.98	.41	(-.10,.92)

[a]$p<.001$

Technology Assessment Workshop. A total of 40 participants completed the pre and post assessments for the Technology Assessment workshop. Statistical significance was obtained for all nine items as shown in Table 19. Effect sizes ranged from .81 to 2.01. The smallest effect size was for the attitude item related to the benefits of a technology assessment for children with disabilities. The largest effect size was for the knowledge item related to the information that needs to be gathered prior to a technology assessment.

Table 19. Technology Assessment Workshop Assessment Results

	n	Pre mean	Post mean	t (2-tailed)	Effect Size	95% Confidence Interval for Effect Size
Knowledge						
I know the purpose of a technology assessment.	40	3.18	4.40	6.10[a]	1.19	(.71,1.66)
I know the procedures of a technology assessment.	40	2.45	4.33	8.96[a]	1.90	(1.35,2.40)
I know what materials are needed for a technology assessment.	40	2.53	4.25	9.84[a]	1.80	(1.26,2.30)
I know who should be included in a technology assessment.	40	2.63	4.40	8.44[a]	1.68	(1.15,2.17)
I know what information needs to be gathered prior to a technology assessment.	40	2.42	4.50	9.61[a]	2.01	(1.45,2.52)
Skills						
I feel that I could contribute to an effective technology assessment for a child.	40	2.53	4.25	11.06[a]	1.73	(1.20,2.22)
I can identify children who could benefit from a technology assessment.	40	2.83	4.10	8.40[a]	1.29	(.80,1.76)
Attitude						
Technology assessments are a vital resource for children with disabilities.	40	3.95	4.70	5.28[a]	.95	(.48,1.41)
All children with disabilities can benefit from a technology assessment.	39	3.92	4.64	4.17[a]	.81	(.34,1.26)

[a]$p<.001$

Workshop Effectiveness. Participants completed three items on each workshop's post assessment to help measure workshop effectiveness. These items asked participants to rate the workshop in terms of increasing knowledge, as well as the usefulness and overall quality of the workshop. All workshops had a mean rating above 4.0 for each of the three items with slight differences among the workshops. Participants rated the Emergent Literacy Workshop the highest for knowledge increase with a mean of 4.51. For workshop usefulness, participants rated the Expressive Arts and Technology Assessment Workshops the highest with a mean rating of 4.53. For overall quality, the Expressive Arts Workshop was rated the highest with a mean of 4.57. The Math, Science, and Social Studies Workshop received the lowest mean rating for knowledge increase (4.12) and workshop usefulness (4.17), while the Adaptations Workshop received the lowest mean rating for overall quality (4.18). See Table 20 for further results on workshop effectiveness. It should be noted that the participant samples differed from workshop to workshop and that there may be factors related to the samples that contributed to workshop differences.

Table 20. EC-TIIS Workshop Effectiveness

Workshop	*n*	This workshop increased my knowledge.	I would rate the usefulness of this workshop as:	I would rate the overall quality of this workshop as:
Adaptations	100	4.22	4.27	4.18
Computer Environment	91	4.27	4.30	4.30
Curriculum Integration	58	4.28	4.19	4.22
Emergent Literacy	72	4.51	4.47	4.49
Expressive Arts	49	4.37	4.53	4.57
Family Participation	39	4.49	4.49	4.36
Math, Science and Social Studies	53	4.12	4.17	4.31
Software Evaluation	32	4.28	4.44	4.44
Technology Assessment	40	4.38	4.53	4.43

Besides the overall effectiveness ratings, participants were asked for comments on each workshop. Sample comments include:

Adaptations Workshop:

- *I really enjoy finding out about the different types of assistive technology for young children. The information will be very helpful for my future classroom.*
- *This workshop was helpful in defining and organizing the information I already had from my recreational and professional use with the computer and children.*

Computer Environment Workshop:

- *Sometimes it is hard to imagine that at such a young age, children can properly operate a computer. However, this workshop helped me think differently. I also learned many cool ways for students to learn at the computer instead of at a regular desk.*

Curriculum Integration Workshop:

- *I really enjoyed this workshop, and I really see the importance of integrating computer work in the general education curriculum.*
- *As interesting as your information is and as great as the concept sounds, I still believe computers really have no place in the early childhood classroom.*

Technology Assessment Workshop:

- *Great information. It was worth my morning!*
- *This was very informative and detailed, which I love. Thanks!*

EC-TIIS Use in Coursework

Seven faculty members from University of Tennessee, Eastern Michigan University, Western Illinois University, and Lincoln Christian College (Illinois) used the EC-TIIS workshops as supplements to coursework in Special Education, Early Childhood, and Instructional Technology and

Telecommunications during the 2003-2004 and 2004-2005 school years. EC-TIIS staff sent a questionnaire through e-mail at the end of each year asking faculty three questions related to benefits of using EC-TIIS workshops, plans for incorporating the workshops into coursework, and suggestions for other faculty about using the workshops. Six out of the seven faculty responded directly to the questions. The seventh faculty member just started to use the workshops in her course and made participation optional for the students. She sent an e-mail with the following comments as feedback, *A few of my students use the workshops. They were very pleased with them. They felt that the workshops were informative and that they learned useful information.*

Faculty feedback. Six faculty members responded to the interview question, *What benefits for yourself and your students have you seen from using EC-TIIS online workshops in your course(s)?* All six indicated that their students gained increased knowledge on technology and assistive technology. Three thought the links were beneficial to students and that the website served as a good resource for them and their students.

An Early Childhood professor indicated, *The benefits for me were having access to up-to-date, high quality information on the workshop topics, including the many links to other resources. The range of topics allowed me to assign those most relevant to course content in three courses. I also benefited from having already-developed assignments through the performance indicators. Additionally, not having to use much class time allowed me to increase course content in an efficient way.* An Early Childhood Special Education faculty member said, *It is really a wonderful resource for me as a learning tool and also to use in instruction.* Another said, *It was a good investment of time.*

All six faculty members plan to continue using the workshops in their courses. When asked what recommendations they had for other faculty who plan to use EC-TIIS for the first time in their courses, four recommended that instructors become familiar with the workshops themselves. Four thought Performance Indicators should be used for assessing student knowledge of material. Two recommended using the online workshops in a lab with students.

Student feedback. Although 203 university students registered at the EC-TIIS website, feedback on a follow-up questionnaire was received from 37 Early Childhood undergraduates, 25 Instructional Technology and Telecommunications undergraduates, and 27 Early Childhood graduates. None of the Special Education undergraduates responded to the questionnaire.

When undergraduate students were asked what benefits they gained from the workshops, responses included *The workshops gave me a lot of useful information on how technology can be integrated into the curriculum*; *Overall, the workshop helped me see the possibilities for many activities and assessment strategies I could use in the classroom*; *They are a great resource to have and are full of information that will help me as a future educator*; *The one resource that was really useful was finding the different adaptive input devices that can be used to help children use technology*; and *This opened up my eyes and gave me a great introduction to assistive technology*.

Undergraduate students were also asked what effects they thought the workshops would have on their future teaching. Responses included *I will remember many of the ways to address the curricular areas using technology and/or adaptations*; *It will help me when I am deciding on a way to include a child with special needs*; *The information is valuable and I feel like I would access the workshops on my own to enrich my teaching*; *It's a great resource. It will give me ideas such as how to set up a computer environment and how to integrate literacy in a positive way in the classroom*; and *If I have a child with special needs in my classroom, I will be able to refer to these workshops to adapt the curriculum to him/her*.

Graduate students were also asked to comment on benefits they gained from the workshops. Although some felt the information was basic for teachers, they commented on the usefulness of new information on technology applications. Comments included *The information was a good review and would be excellent for college students or first year teachers*; and *The Emergent Literacy workshop contained basic information; however, there were some good ideas on how to make page-turners*.

When asked how they integrated workshop content into their curriculum, 21 of the 27 graduate students indicated that they already integrated content or that they planned to integrate in the near future. Comments included *I have used technology more when teaching units and specific skills*; *Made sure that* *my centers in my own classroom followed the guidelines presented in the workshop*; *I have integrated it into my thinking processes that influence my planning and preparation of materials and classroom environment*; *I have used some of the information in my centers!*; and *I have found myself using the various links from the workshops*. A few of the graduate students noted using specific strategies from the workshops, such as using the computer sign-up for emergent literacy, putting more options on the computer for the expressive arts, and trying the parent involvement ideas.

Graduate students were also asked how their participation in the workshops impacted the children in their classroom. All 27 students responded to this question with comments related to children's increased skill development and choice-making, benefits gained from an appropriate environment set-up, increased access to materials and increased time on computer. Responses included: *By integrating technology into the curriculum the students are getting another chance to learn information and make connections*; *I think they are becoming more creative. They want to express themselves so much more*; *My students are given more choices in the writing center*; and *The children are, and will be, influenced by the activities, lessons, and environment*. Twelve of the 27 students expressed an interest in continuing to use the EC-TIIS workshops in the future.

Participants' Evaluation of EC-TIIS Website

Ninety of the 415 registrants (22%) responded to the online *Website Evaluation*, despite the fact that the survey is optional to participants. Respondents were Early Childhood Educators, Early Childhood Special Educators, Head Start, University students, Pre-Kindergarten teachers, family members, and Others. They rated workshops according to Appearance, Navigation, and Content. For all items, at least 95% of respondents marked *Agree* or *Strongly Agree*. The evaluation form includes nine items covering Appearance, six related to Navigation, and eight related to Content. See Table 20 for the results.

Table 21: Website Evaluation Results (October 2002 – May 2005) (*n*=90)

Category A - Workshop Use	**Comfortable**	**Average**	**Uncomfortable**
Typing on a keyboard	85 (95%)	2 (2%)	3 (3%)
Viewing Web Page	86 (96%)	3 (3%)	1 (1%)
Downloading Images	81 (90%)	7 (8%)	2 (2%)
Downloading and viewing PDF files	79 (88%)	10 (11%)	1 (1%)
Sending Email	89 (99%)	4 (4%)	0
Category B - Appearance of Site	**Strongly Agree**	**Agree**	**Disagree**
Site is user friendly	68 (76%)	21 (23%)	1 (1%)
Initial page captures user's attention	47 (52%)	42 (47%)	1 (1%)
Fonts are easy to read	76 (85%)	13 (14%)	1 (1%)
Text is planned well for reading and printing	69 (77%)	21 (23%)	0
Graphics are fast loading	73 (81%)	17 (19%)	0
Graphic content is appropriate to site	72 (80%)	18 (20%)	0
Graphic Design is appealing	69 (77%)	20 (22%)	1 (1%)
Tables or Lists enhance readability	66 (73%)	24 (27%)	0
Graphics complement content	69 (77%)	21 (23%)	0
Category C - Navigation of Site	**Strongly Agree**	**Agree**	**Disagree**
Adequate site map is easy to find	60 (67%)	30 (33%)	0
Headings are descriptive of content	73 (81%)	17 (19%)	0
Links work	65 (72%)	21 (23%)	4 (5%)
Links are easily identified and labeled clearly	69 (77%)	21 (23%)	0
Site is easy to navigate	68 (76%)	17 (19%)	5 (5%)
Main page is easy to return to	71 (79%)	17 (19%)	2 (2%)
Category D - Site Content	**Strongly Agree**	**Agree**	**Disagree**
Workshop meets the needs of the targeted audience	63 (70%)	27 (30%)	0
Workshop content addresses the topic thoroughly	64 (71%)	25 (28%)	1 (1%)
The content reflects developmentally appropriate practice	70 (78%)	19 (21%)	1 (1%)
Information is presented objectively	67 (74%)	23 (26%)	0
Materials are current	73 (74%)	17 (26%)	0
Terminology is current	74 (82%)	16 (18%)	0
Information is organized effectively	75 (83%)	15 (17%)	0
Resource links are relevant	68 (76%)	22 (24%)	0

Although the *Workshop Evaluation* form is a 4-point rating scale, items were collapsed during the analysis. Since no one selected *Strongly Disagree* in Category B, C, and D it was collapsed with *Disagree*. For Category A*, Comfortable* and *Somewhat Comfortable* were collapsed to *Comfortable*, and *Somewhat Uncomfortable* was collapsed with *Uncomfortable*.

Comments submitted by respondents include *It is very easy to find the information you are looking for*; *I like having headings to work with*; *I really like the lesson plans that accompany the software programs; It [Expressive Arts workshop] had a lot of ideas and solutions that can be put into practice* *without a lot of money*; *It was easy to get to the items that interested me the most*; *The site was informative and will be helpful in my field of work*; *I love how the site is set up for each workshop. It is very easy to find the information you are looking for*; and *The only navigation problem I had was that there were so many links and other things I could go to and I was afraid to get off track.*

The most frequently used workshop, according to the 90 respondents who completed the *Website Evaluation Survey*, was the Emergent Literacy Workshop (30%). It was followed by Computer Environment (23%), Math, Science, Social Studies (19%), Expressive Arts (17%), Adaptations (16%), Curriculum Integration (14%), Technology Assessment (12%), Family Participation (11%), and Software (10%).

The browsers used most often by the 90 participants were Internet Explorer (75%), Netscape (6%), AOL (5%) and other browsers (4%). The survey revealed that EC-TIIS was accessed through the Internet most often by LAN/Ethernet (36%), then Modem (32%), Cable DSL (15%), and Other (11%).

Summary of Conclusions

Results of EC-TIIS 2 demonstrate attainment of the study's research goals and the effectiveness of the workshops on the use of technology with young children with disabilities. First, data results from the surveys and workshop pre and post assessments indicate that EC-TIIS online workshops were effective in increasing knowledge, attitude, and skill in using technologies in the early childhood environment. An analysis of the nine sets of pre and post assessments showed statistical significance for a majority of the items. Not only is EC-TIIS effective, the workshops fulfill a need, as evidenced by the immediate response to a posting on a Child Care Exchange listserv, for online training opportunities for early childhood educators, childcare providers, and families. Comments from participants indicate new knowledge gained in areas related to technology and curriculum integration, and specific gains in emergent literacy and expressive arts knowledge. Links provide further information in areas needed by participants.

Second, QUAL data from educators points to the effects of their EC-TIIS participation on the use of technology in their classroom. Educators indicated changes made to their classroom as a result of knowledge gained in EC-TIIS Workshops. Changes mentioned most often included making materials and equipment more accessible to children, designing the computer environment more appropriately, and integrating specific strategies at the computer, such as the use of a sign-up sheet. Although a small number of educators already knew some of the information, they still thought the website served as a good resource for themselves as well as others in the field.

Third, early childhood staff who used the online workshops observed many benefits for children resulting from their participation in EC-TIIS. Children have more time on the computer and more choices in the writing center. The reported changes made by educators to their centers, and specifically, the computer center, indicated that materials became more accessible to children both on and off computer.

Fourth, participants who used the information from the workshops to make changes in their classroom and curriculum reported increased access to technology and integrated activities for children in the classroom. In turn, changes in children's progress were also noted.

Fifth, educators, faculty, and students reported benefits from participation in EC-TIIS as noted in the Results and Discussion section. A small number of participants indicated problems in using the website which included links not working or users getting lost within the website. No negative effects were reported by workshop participants.

Lessons Learned and Problems Resolved

EC-TIIS 2 staff learned many lessons related to the development of a sophisticated online data collection system and the implementation of research in an online environment. The following discussion focuses on problems encountered and solutions currently being implemented in Phase 3.

Time Needed for Online Data Collection System

The time needed to development the online system of surveys and assessments took longer than anticipated. Also testing the system to make sure data was being transferred directly into the *MySQL* database was another essential step in the process. The resulting data collection system provides the basis for EC-TIIS 3 research and data retrieval and provides a model which can be used by others conducting online training.

Mandatory Completion of Pre-assessments

A second lesson learned was that online surveys and assessments must be programmed so that participants are required to complete them before accessing other parts of the website. Without this feature, it is difficult to require users to complete the assessments. Registration and Technology Survey were programmed as mandatory for all participants; however, the Workshop Pre-Assessments were not. Staff thought that users would get frustrated with stopping to complete Pre-Assessments when they tried to get from one workshop to another. However, the resulting number of pre-assessments completed was low, compared to total number of registrants. EC-TIIS 3 has resolved this problem by making completion of all nine workshop pre-assessments mandatory before entering a workshop for the first time. The number of participants completing pre-assessments is now equal to the number of registrants.

Mandatory Completion of Questions on Surveys

A related lesson concerns making answers on surveys mandatory. Many of the participants left questions unanswered on the *Technology Survey*. This resulted in incomplete data. EC-TIIS Programmer has resolved this problem by programming the surveys so that participants receive a message if they do not answer one of the questions. The person is also shown the item that is incomplete. After the user answers all of the questions he/she can then proceed into the workshops. This change has resulted in complete sets of data for the surveys.

Educators without Classrooms Bypass Survey

Another change related to the initial surveys involved educators who do not have their own classrooms. Participants who chose any of the Educator groups, such as Child Care Provider, Special Educator, Preschool Educator, or Head Start Educator, were directed to the *Classroom Use of Technology* survey. Those who were not classroom teachers were unable to complete questions on this survey; therefore, a change in this process was needed. EC-TIIS 3 now has a separate page that appears for educators. They are asked if they currently teach in a classroom environment. If not, then they bypass the *Classroom Use of Technology Survey*. Staff expect the survey results to be more accurate now, since users may have put in false answers in the past to get through the survey.

Professional Development Credit Needed as Incentive

In Phase 2, EC-TIIS did not offer professional development credit for participants. Without this incentive, it was difficult to get educators from the originally planned research sites to complete assessments or provide other data. Although survey results show that 277 out of the 415 EC-TIIS participants indicated that they were invited to the website, 234 of those were university students. EC-TIIS did not have the long-term participation of educators needed for a second study; therefore, a detailed follow-up study was not possible.

Administrators cited lack of professional development credit incentives and lack of time as the two main reasons their staff did not participate in EC-TIIS. The Hawaii administrator could persuade only three of the expected 150 teachers to participate in the workshops. The administrator from the Tazewell-Woodford Counties Head Start had a similar experience with only two of her 38 invited teachers participating.

EC-TIIS has taken steps to increase educator participation in Phase 3 by offering four types of professional development credit: Certificate of Completion, Continuing Education Units (CEUs), Continuing Professional Development Units (CPDUs), and graduate course credit. Information on credit options is now available on the FAQ (Frequently Asked Questions) page at the EC-TIIS website. In Spring 2005 EC-TIIS staff received over 60 requests for information on credit. Several EC-TIIS 3 participants have already completed requirements for credit. Since the workshops are online, credit is available on an ongoing basis with the exception of the graduate course, which is scheduled to begin in June 2006 and will be offered every eight-week session through the Instructional Technology and Telecommunications Department at Western Illinois University.

Participants requesting credit need to complete a Workshop Post Assessment and Exit Survey for each of the workshops. Additional forms and written work may be required depending on the credit option. The mandatory completion of these forms will result in an increased number of complete sets of pre and post assessment data and more QUAL data. EC-TIIS anticipates increased and more long-term participation by educators in 2006 and 2007 resulting in more QUAN and QUAL data.

Difficulty Involving Families in Data Collection

Related to EC-TIIS 2's lack of educator participation is the low number of families who participated in the online workshops. The original plan was to have educators at the research sites invite families to participate in the workshops. Since the number of educators was low, family participation was also low. Although the number of participants identifying themselves as family members is low, this number may not be accurate. If a family member is also an educator, then that position might be entered in the Registration, instead of Family. The Family survey is only given to those who check Family as group. If a family member does not identify him/herself as primarily Family, then he/she will not be given the *Family Survey* to complete. Changes EC-TIIS 3 has made to increase educator participation are also expected to increase family participation, particularly if educators invite families of children in their classroom to view the website.

Difficulty Tracking Online Participants

EC-TIIS staff learned that one problem in collecting data online is the difficulty in tracking website participants. When a follow-up survey was distributed via e-mail to 70 participants at the end of Year 2, 20 messages were returned indicating invalid e-mail addresses. Only three completed surveys were received. As discussed earlier, many of these participants were students when they first used the workshops, and they had no incentive to complete a follow-up survey. With the professional development credit option now available, EC-TIIS 3 anticipates more successful data collection over time. Depending on their selected credit option, participants may be asked for follow-up classroom or child data. EC-TIIS 3 staff anticipate a larger sample size for random selection of participants into Study 2, providing more in-depth QUAL data.

EC-TIIS 3 has resolved most of the problems encountered in EC-TIIS 2. EC-TIIS now offers professional development credit in the form of a Certificate of Completion, Continuing Professional Development Units (CPDUs), Continuing Education Units (CEUs), and graduate credit to participants. Educators now have an incentive, if needed, to participate in EC-TIIS. This change may lead to increased educator participation, which in turn may lead to increased family participation from sites.

Impact

Dissemination Activities and Results

EC-TIIS 2 staff impacted over 2500 educators and families with information on the EC-TIIS website and research results through dissemination activities, including international, national, regional, state, and local conference presentations and exhibits and postings on listservs and websites. A brochure, originally developed in EC-TIIS Phase 1, describing the EC-TIIS workshops and registration procedures was revised in the first year of EC-TIIS 2. Brochures were distributed at conferences and workshops, and through requests received via phone, mail, or e-mail.

Conference presentations. International conference presentations and poster sessions included the 2002 Council for Exceptional Children's Division for Early Childhood (DEC) Conference in San Diego, California with 15 participants, and the 2003 DEC Conference in Washington, D.C. with 60 participants. Staff also presented sessions on EC-TIIS to a total of 110 participants at two annual National Association for the Education of Young Children (NAEYC) conferences located in Chicago in 2003 and Anaheim, California in 2004. Besides the conference presentations, staff distributed 150 brochures to visitors of NAEYC's Technology Resource Center sponsored by the Technology and Young Children Interest Forum.

Staff also provided presentations and poster sessions at national conferences. EC-TIIS research procedures and results were provided to over 100 participants of OSEP Research Project Directors' Conference during poster sessions in 2003 and 2004 and during a conference presentation in 2005. Staff also presented information about EC-TIIS to 80 participants at the National Center for Technology Innovation Conference's Demonstration Event in 2003 and 2004. In 2002 and 2004 staff distributed 100 brochures to Early Childhood Project Directors, and Part C and Part B Coordinators at the OSEP National Early Childhood Conference in Washington, D.C.

Staff conducted hands-on computer sessions during three regional Midwest Association for the Education of Young Children Conferences. Over 50 participants registered on the EC-TIIS website and explored the workshops during these hands-on sessions in Peoria, Illinois, in April 2003; in Kansas City, Kansas in 2004; and in Minneapolis, Minnesota in 2005. A conference session on EC-TIIS was presented to 30 participants at the Chicago Metropolitan Association for the Education of Young Children Conference in January 2003.

Staff provided presentations and distributed information on EC-TIIS to 140 participants of the state conference, the Illinois Education and Technology Conference, in Springfield, Illinois for the past 3 years. Another statewide dissemination activity took place in Middletown, Connecticut, in May 2003 when the Co-Director presented information on EC-TIIS online workshops to 20 early childhood professionals at a 2-day workshop. The regional training coordinator expressed interest in including EC-TIIS as part of their state's technology initiative; however, no further progress was made toward this goal due to the state's administrative staff turnover and the lack of professional development credit from EC-TIIS. With the availability of credit options in EC-TIIS's third phase, statewide use of the online workshops may again be a possibility.

A local dissemination activity that EC-TIIS staff participate in every year is the Tech Fest conference sponsored by Western Illinois University's College of Education and Human Services. Staff demonstrate the website on a large electronic White Board at the conference exhibit area. Over 300 students, faculty, and community members browse the exhibits. Staff participated in the conference for the past 3 years.

Listserv postings. Besides conference presentations and exhibit displays, staff disseminated EC-TIIS information through postings on listservs and professional development websites. In 2004 a news brief advertising EC-TIIS' availability for educators and families was posted on NAEYC's Technology and Young Children Interest Forum's listserv. During the week following the posting, 25 e-mail inquiries and 30 website registrations were received. One of the inquiries was from the Program Specialist for the Riverside County Child Care Consortium in Riverside, California. After reviewing the workshops, the Program Specialist, who coordinates training for childcare providers throughout the state, added the EC-TIIS website link to their Child Development Training website (www.childdevelopment.org), under Western Illinois University. She also distributed EC-TIIS information to 1000 childcare providers in Fall 2004 during workshops. As reported in an earlier section, California is third in number of EC-TIIS participants from an individual state.

Another result of the NAEYC listserv posting was a link to EC-TIIS being placed on the New York City Early Childhood Professional Development Institute website. Information on our online workshops can be found on the What's New page under Conferences and Events (www.earlychildhoodnyc.org/additional/whatsnew.cfm). Although only four EC-TIIS 2 registrants were from New York, EC-TIIS staff have seen an increase in participation from New York for Phase 3.

As a result of dissemination activities, EC-TIIS staff note increased website registrations and e-mails, especially following each conference event or listserv posting.

Increased registration means more participants and more data collected on website use and effects. EC-TIIS 3 also has a larger sample for random selection of Study 2 participants as a result of the increased registrations.

Website as Product

The development of the EC-TIIS website is in direct response to the needs of children with disabilities and their families. The product of this second phase after the testing and refining of the website is a teaching/learning website that is easy for families and educators to access and use and that contains information leading to improved technology services for young children with disabilities. Upon the completion of the third phase of EC-TIIS, the early childhood community will have a set of online workshops which are tested as effective for improving young children's access to the curriculum.

The EC-TIIS website product is based on training content from the Center for Best Practices in Early Childhood's tested and effective early childhood technology-related projects, or Knowledge Base projects. The content was developed in congruence with appropriate early childhood philosophy and curriculum according to national standards related to developmental appropriateness and curriculum integration promoted by the National Association for the Education of Young Children, the Council for Exceptional Children's Division of Early Childhood, and the National Board for Professional Teaching Standards. The guidelines developed by these organizations form the criteria by which teacher education programs are accredited by the National Council for Accreditation of Teacher Education.

Implications for Practice, Policy, and Future Research

EC-TIIS 2 communicates appropriately with target audiences and insures through extensive dissemination practice that the web site is used by policy makers, administrators, teachers, families, and others to improve results for children with disabilities. The website is designed to meet the training needs of early childhood administrators, teachers, program assistants, therapists, other support personnel and families of young children with disabilities. Targets of Phase 2, Head Start educators and families, preschool special educators and families of children in early childhood special education programs, university faculty and students continue to be involved in Phase 3.

The findings of EC-TIIS 2 provides evidence on the effectiveness of web-based training as a training tool for educators and families in advancing educational opportunities of young children with disabilities. Increased participation by educators and families in EC-TIIS during Phase 3 combined with more extensive data collection will produce results that will contribute to the field of web-based training as well as early childhood and assistive technology. If web-based training is an effective training tool, then young children with disabilities will benefit.

EC-TIIS 2's establishment of an online data collection system will benefit other federally funded projects at the Center for Best Practices in Early Childhood as well as other projects throughout the country. The system establishes online data collection in a secure environment designed to integrate seamlessly into a statistical database for data interpretation. EC-TIIS 3 staff continue to use state of the art methods to collect data online, methods not currently being used by computer programming personnel at many universities. The resulting product and procedures will add valuable information to the field of early childhood technology as well as to research on online data collection methods.

Future Activities

EC-TIIS was funded as a 3-year Steppingstones of Technology Innovation Phase 3 project beginning in October 2004. Research on the effects of EC-TIIS online workshops on educators, faculty, and families and resulting effects on young children with disabilities, which began in Phase 2, is continued and expanded in Phase 3. Lessons learned in Phase 2 have resulted in improvements in data collection, online procedures, and workshop participation. By offering professional development credit for participation in the online workshops, EC-TIIS 3 staff have already seen increased registrations from educators. The result is a larger sample size for Study 2 selection. With changes in mandatory completion of assessments and surveys and increased numbers of educators and families for Study 2, EC-TIIS 3 anticipates not only increased quantity, but also better quality of data.

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Appendix: Sample Pages from the EC-TIIS Website

Early Childhood Technology Integrated Instructional System Curriculum Integration

: About Us : Contact Info : Discussion Boards : Products : Resources : Site Map : Workshops :

Check My Progress | Evaluate Workshop

Home < **Logged In** < Curriculum Integration Workshop < 2 < 3 < 4

Main Topics

Introduction
Planning Technology Integration
Integration Examples
Performance Indicators
Curriculum Integration Site Map

Introduction to Technology Integration

Sub-Topics (Click on topic you wish to see)

What is Curriculum Integration?
Why Integrate Technology?

Introduction to Curriculum Integration

Children will benefit most from technology use if software is integrated into the preschool curriculum. The learning environment should not be confined to the boundaries of the computer center; it should extend to all areas of the classroom. Using everyday materials along with specialized materials, such as specialty printer papers, early childhood staff can create off-computer activities to be used throughout the different classroom centers. In this way content from software is extended into all areas of the curriculum.

What is Curriculum Integration?

Although curriculum integration is discussed in journals and at educational conferences, it is hard to find one definition that encompasses the broad scope of what integration really is. Based on extensive experience in using software in the classroom and researching the effects of technology on young children, The Center for Best Practices in Early Childhood defines technology integration in the following way.

- Technology integration involves appropriate software which helps introduce, support and expand children's learning in the curriculum. Integration is based on themes in the classroom which are derived from children's interests and everyday experiences, as well as knowledge, skills, attitudes, and values.
- Software becomes the integrated tool that encompasses all areas of learning including literacy, communication, art, music, social studies, science, math and motor skills. Multiple outcomes result from integrated activities.
- Integration includes all children through the use of assistive technology with customized activities and adaptive input methods, such as the IntelliKeys, switches, and touch screens.

Early Childhood Technology Integrated Instructional System — Emergent Literacy

: About Us : Contact Info : Discussion Boards : Products : Resources : Site Map : Workshops :

Check My Progress | Evaluate Workshop

Home < **Logged In** < Emergent Literacy Workshop < 2 < 3 < 4 < 5 < 6 < 7 < 8 < 9 < 10 < 11 < 12 < 13

Main Topics

Introduction
Basic Assumptions
Literacy Rich Environment
Managing the Classroom Environment
Technology Integration
Interactive Commercial Software
Adaptations/Customization
Assessment of Literacy Skills
Performance Indicators
Emergent Literacy Site Map

Adaptations That Support Literacy

Sub-Topics (Click on topic you wish to see)

Introduction to Adaptations
Page Turners
Communications Display
Book Holder
Visual Adaptations
Computer Adaptations
Switch Activities
Intellikeys
Discover: Kenx

Adaptations that Support Literacy

One of the keys to successful acquisition of literacy is children's active participation in literacy activities. Children need to be actively involved in handling books and interacting with family members and teachers during reading time. Through the help of adaptations to materials or adaptive equipment, all children can participate in literacy activities. Activities can be easily customized to meet children's individual needs.

Children with disabilities as well as very young children who do not have the fine motor skills to turn pages can benefit from page turners, communication boards and aprons, and a book holder. Visual adaptations can also be made to make materials more interactive and appealing to young children.

..To Top

View Link ACTTive Technology article. "Adapting Literacy Activities for Young Children" by Linda Robinson

Early Childhood Technology
Integrated Instructional System

Emergent Literacy

Emergent Literacy Workshop Post-Assessment

Please fill out this brief questionnaire.

Please rate your level of agreement with the following statements:

	Low		Average		High	N/A
1) I know techniques that can be used to assess young children's emergent literacy skills.	○	○	○	○	○	○
2) I know how to adapt reading materials for a preschool child who has difficulty turning the pages of a book.	○	○	○	○	○	○
3) A sign-up method should be used to manage turn-taking at the computer, as well as promoting emergent literacy skills.	○	○	○	○	○	○
4) Using labels or environmental print in the classroom promotes emergent literacy.	○	○	○	○	○	○
5) I can design a technology curriculum activity to promote emergent literacy.	○	○	○	○	○	○
6) I can arrange the environment so that children have easy access to books and writing materials.	○	○	○	○	○	○

Please rate the effectiveness of the Emergent Literacy Workshop.	Poor		Average		High	N/A
7) This workshop increased my knowledge of emergent literacy for young children.	○	○	○	○	○	○
8) I would rate the usefulness of this workshop as:	○	○	○	○	○	○
9) I would rate the overall quality of this workshop as:	○	○	○	○	○	○

Comments on this workshop:

Submit Post-Assessment | Click to Reset Form

Main Topics

Technology Integration

Sub-Topics (Click on topic you wish to see)

Technology Integration

The computer center can be an extension of the other learning centers. Many interactive early childhood software programs, are perfect for extending visual arts and music activities or for providing the basis for creative dramatics and dramatic play.

They could include programs such as:

- ArtSpace
- The Backyard
- CircleTime Tales
- A Silly Noisy House
- Switch Intro
- Thinkin' Things

A visit to an art museum, whether in person or on the computer can be the springboard for many activities.

View PDF View ArtSpace Activity

View PDF View ArtSpace Integration PDF

Many software programs contain musical features which can be used in the classroom during music activities.

View PDF View Music at the Computer PDF

View PDF View Switch Intro- Sounds Around Me Activity

Expressive arts and emergent literacy are supported through classroom experiences based on a favorite book.

View PDF View I Love A Mouse Activity

View PDF View I Love A Mouse Integration

Early Childhood Technology
Integrated Instructional System

Math, Science, & Social Studies

: About Us : Contact Info : Discussion Boards : Products : Resources : Site Map : Workshops :

Check My Progress | Evaluate Workshop

Home < **Logged In** < Math, Science, Social Studies Workshop < 2 < 3 < 4 < 5 < 6

Main Topics

Overview
Designing the Environment
Technology Integration
Adaptations
Assessment
Performance Indicators
Math, Science, & Social Studies Workshop
Map

Introduction to Math, Science, and Social Studies

Sub-Topics (Click on topic you wish to see)

Introduction
Learning Standards
State Early Learning Standards
Position Statement on Early Childhood Math
National Standards

Introduction to Math, Science, and Social Studies

Young children learn math, science, and social studies concepts as they explore the world around them. Early childhood teachers and families can design the environment and activities to give children opportunities to construct knowledge in these areas. Through technology all children can gain access to their environment and learn critical developmental skills. New advances in technology, such as the computerized microscope and the latest digital technology, make children's discoveries come alive. Graphing software helps children organize, categorize, and understand information they have collected.

Although the three curricular areas are interrelated, a close look at the standards for each serves as an overview of the content which children should be learning at the preschool level.

Learning Standards

Math

The National Committee for Teaching Mathematics (NCTM, 2000) defines appropriate math experiences as those that challenge young children to explore ideas related to patterns, shapes, numbers, and space with increasing sophistication.

View Link — View NCTM Standards
http://standards.nctm.org/document/chapter4/index.htm

Everyday activities can be the basis for learning mathematical concepts:

- Recognizing patterns (stories with repetitive phrases, songs and nursery rhymes)
- Following directions (games)
- Sorting (putting away silverware)
- Reasoning (constructing with toys)
- Representing (writing, drawing)

By providing an appropriate environment with plenty of opportunities to explore materials and participate in problem solving experiences, teachers and families can support children's math concept development. Many early childhood books are based on number concepts or

Early Childhood Technology Integrated Instructional System — Computer Environment

: About Us : Contact Info : Discussion Boards : Products : Resources : Site Map : Workshops :

Check My Progress | Evaluate Workshop

Home < **Logged In** < Computer Environment Workshop < 2 < 3 < 4 < 5

Main Topics

Overview
Adaptations to Environment
Preschool Computer Center
Management Strategies
Performance Indicators
Computer Environment Site Map

Performance Indicators

Computer Environment Performance Indicators

1. Evaluate the computer environment in two classrooms.Discuss the strengths and weaknesses of each computer center from an environmental perspective.

2. Write a design plan for an appropriate computer environment for a classroom. What the essential components of a computer center? What are the important considerations? Describe management strategies that could be used for the computer center environment.

3. Describe how the computer environment could be adapted for a preschool child who has difficulty using a mouse.

4. Design an off-computer activity using one of the specialty printer products.

5. Describe techniques to make the computer environment safe for children.

6. Assess a child's position at the computer and write suggestions for any needed improvements or what kind of disability (if any).

7. Write a plan for acquiring computer equipment, justifying each piece of equipment requested.

8. Design a CD-ROM holder or hanger for displaying software in the classroom for children's use.

9. Plan a computer environment workshop and describe activities and information which would be used.

Early Childhood Technology Integrated Instructional System — Family Participation

: About Us : Contact Info : Discussion Boards : Products : Resources : Site Map : Workshops :

Check My Progress | Evaluate Workshop

Home < **Logged In** < Family Participation Workshop < 2 < 3 < 4 < 5 < 6 < 7

Main Topics

- Introduction
- Levels of Participation
- Awareness Level
- Family Technology Workshops
- Follow-Up Workshops
- Assistance
- Ideas to Increase Participation
- Family Resources
- Performance Indicators
- Site Map

Family Participation -- Performance Indicators

1) Describe the three levels of family participation.

2) Develop a family newsletter which includes information on technology activities and benefits of using the computer in the preschool classroom.

3) Design a floor plan for a family technology awareness workshop indicating work stations and how they will be set up in the room.

4) List four ideas for increasing family participation in technology activities with their child and the classroom.

5) Design an invitation for a family awareness workshop which incorporates one of the children's computer products

6) Create a slideshow focusing on classroom technology activities which can be shown to families during a workshop or open house.

7) Develop an evaluation form to get family feedback on a technology workshop.

8) Plan an agenda for a follow-up technology workshop which includes activities, software and equipment to be offered to families.

9) Make a video for families which summarizes the technology activities conducted throughout the year.

10) Write a report of the results of a family technology day in your classroom, including a description of the activities, your observations of the children and family reactions, and comments or written feedback from families.

Now that you have seen the Family Participation workshop, please help us in our research by: