Early Childhood Technology Integrated Instructional System (EC-TIIS) Phase 3: Final Report

by

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Executive Summary

The Early Childhood Technology Integrated Instructional System (EC-TIIS 3), a 3-year Steppingstones of Technology Innovation Phase 3 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 project began in September 2004. EC-TIIS 3's goals were four-fold: (1) to test the effects of EC-TIIS' online training developed during EC-TIIS Phase 1 and tested and refined during Phase 2 on a diverse audience in large, complex settings, ultimately providing a teaching/learning community web site easy for families and educators to access and use; (2) to improve access to functional use of technologies in developmentally appropriate curriculum targeting young children with disabilities and their families; (3) to determine the effects of strategies to increase the quantity and quality of web-based training and data collection; and (4) to further refine EC-TIIS usability, to advance the availability, quality, and use of technology in addressing the practical problem of improving online education. The EC-TIIS site <www.wiu.edu/ectiis/>is a unique teaching/learning website that combines training content from the Center's tested and effective early childhood technology-related projects into a series of nine workshops designed to provide technology knowledge and skills. EC-TIIS 3 was designed to further test and confirm Phase 2 results on the website's feasibility as a training tool for adults to improve the 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 3 research design consisted of three related multistrand mixed model studies. Study 1, which included early childhood educators and families, was designed to make comparisons to EC-TIIS 2 findings; to determine the effectiveness of the workshops on a large number of diverse users; and to answer exploratory research questions related to website use and other factors. Study 2, which included early childhood educators who completed at least three online workshops and families who completed at least one workshop, was designed to confirm, extend, and compare findings of Study 1. Study 3, which included university and community college faculty and students, was designed to explore, confirm, extend, and compare findings related to use of the workshops as a supplement to university and community college courses and as a stand-alone graduate course.

EC-TIIS 3 participants consisted of educators and support staff from early childhood and early childhood special education programs; families of children with disabilities and at risk in early childhood programs; and faculty and students in Early Childhood, Special Education, and Instructional Technology programs at universities and community colleges. During the project's funding period, 1634 individuals from 48 states and 2 territories of the United States, and 42 other countries registered on EC-TIIS website.

Quantitative and qualitative data were collected through online surveys and assessments available at the website. Additional qualitative data were collected through questionnaires sent by e-mail to educators, families, 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 3 demonstrate attainment of the study's research goals and the effectiveness of the workshops. Data results from surveys and workshop pre and post assessments indicate that EC-TIIS online workshops were effective in increasing participants' 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. As a result of knowledge gained in EC-TIIS workshops, educators made changes in their classroom, 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.

Findings of EC-TIIS 3 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 add valuable information to the early childhood technology field as well as to the research on online data collection methods.

EC-TIIS 3 staff impacted over 2,500 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, published articles, and postings on listservs and website links. EC-TIIS continues to impact educators and families through ongoing access to the extensive training materials available on the website. For example, since January 9, 2008, when EC-TIIS staff downloaded Phase 3 data in preparation for analysis and summary for this report, 323 participants registered on the website. A graduate student completed the online workshops as part of IDT 573 coursework in Fall 2008. Faculty from Eastern Michigan University, St. Petersburg College, and other universities and community colleges continue to incorporate the online workshop content into their early childhood courses. Staff continue to receive requests for CEUs, CPDUs, and Certificate of Completion. Nine additional participants earned CPDU credit, six earned CEUs, and 13 earned a Certificate of Completion this past year. At this time, EC-TIIS online workshops continue to be available through the Center for Best Practices in Early Childhood. Center staff will collaborate with the College of Education and Human Services at Western Illinois University and seek other external funding to continue making the online workshops accessible to early childhood educators, families, university faculty and students in the future.

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The Early Childhood Technology Integrated Instructional System 3 (EC-TIIS 3), housed in the Center for Best Practices in Early Childhood (the Center) within the College of Education and Human Services at Western Illinois University (WIU), was funded in 2004 by the U.S. Department of Education's Office of Special Education Programs (OSEP) as a three-year Steppingstones of Technology Innovation Phase 3 Project. EC-TIIS 3 was designed to confirm the positive results of EC-TIIS 2 (Hutinger, Robinson, Schneider, & Daytner, 2006) and to test the effects of web-based training on a diverse audience in large, complex settings, 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 the Center's tested and effective early childhood technology-related projects, into a series of nine workshops designed to provide technology knowledge and skills.

Goals and Objectives

The major goals of EC-TIIS 3 were four-fold: (1) to test the effects of EC-TIIS' online training on a diverse audience in large, complex settings, ultimately providing a teaching/learning community web site easy for families and educators to access and use; (2) to improve access to functional use of technologies in developmentally appropriate curriculum targeting young children with disabilities and their families; (3) to determine the effects of strategies to increase the quantity and quality of web-based training and data collection; and (4) to further refine EC-TIIS usability, to advance the availability, quality, and use of technology in addressing the practical problem of improving online education. The research goals were as follows.

1. Describe and explain factors that influence participants' participation in, and use of, web-based EC-TIIS training.
2. Describe and explain how participating in EC-TIIS affects attitudes, knowledge, and skills acquired by workshop participants.
3. Describe and explain how implementing the knowledge and skills acquired in EC-TIIS

workshops affects children's access to, and use of, technologies.

4. Analyze 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 in complex settings, together with any negative effects.
6. Describe and explain factors that affect the use of EC-TIIS workshops in pre-service and graduate early childhood courses.

Objectives to meet these goals included 1.0 *Maintain the EC-TIIS website*; 2.0 *Implement the research plan to study the effectiveness of the approach and its sustained use in multiple complex settings according to a variety of contextual factors*; 3.0 *Analyze and summarize data to determine effectiveness of EC-TIIS online workshops*; 4.0 *Disseminate information about EC-TIIS*. 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 website) (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, 2002). 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 newer technologies, 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).

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).

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 (Hutinger, et al., 2006) 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 of Web-based Instruction

Internet access is now commonly available in schools, libraries, and homes. According to Neilsen/Net Ratings (2004) almost 75% of Americans have Internet access in their homes, and more women use the Internet at home than men (for ages 35-54, 82% of women and 80% men; ages 25-34, 77% of women and 75.6% of men). The Information Use Management and Policy Institute found that 98.7% of the nation's public libraries are connected to the Internet, and 95.3% provide Internet access to the public (Bertot & McClure, 2002). In 2000-2001, 90% of public 2-year and 89% of public 4-year degree-granting institutions offered online education courses (U.S. Department of Education, 2003), demonstrating a significant increase, up from 33% in 1995 (Rimlinger, 2003). Nearly 2.9 million students were enrolled in college-level online courses in 2000-2001 (*Distance Learning*, 2003; Rimlinger, 2003).

Some researchers have found that there are 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). Researchers frequently cite lack of a face-to-face relationship between student and teacher as a possible disadvantage of online learning (O'Malley & McCraw, 1999; Roblyer & Ekhaml, 2000; University of Illinois, 1999). However 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).

Technology supports adult learning and functions both as a delivery system and a content area (Barnett, 2003; Wilson & Lawry, 2000). Research on the effects of technology for adult learning point to the importance of using a variety of multimedia tools and the web (Driscoll & Alexander, 1998; Ginsburg, 1998; Graebner, 1998; Hyerle, 1996; Rosen, 1999). Web-based learning meets the needs of many 21st century learners. Online courses are convenient because learners are not constrained by geographic location or confined to a set hour for participation (Butler, 2003; Mariani, 2001). According to Butler, other distance learning advantages include flexibility, availability, time savings, and no interruption to job. Website 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 constructivist and collaborative 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, 2002; 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 website.

Research and Effective Practice

The mixed models design for EC-TIIS 3 studies was based on up-to-date research protocols (Creswell, 2003; Tashakkori & Teddlie, 2003) incorporating quantitative and qualitative data and procedures which were useful in gaining an overall picture of the effects of EC-TIIS in a larger, real world context. The EC-TIIS website content is based on the effective practices demonstrated in the positive results of 10 federally funded research, demonstration, and outreach technology projects for young children with disabilities, *Knowledge Base Projects*, carried out by the Center. The content of the instructional system, incorporated in EC-TIIS 1 (Hutinger, Robinson, & Schneider, 2004), 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 (Bredekamp & Copple, 1997), the Division of Early Childhood (Sandall, McLean, & Smith, 2000), standards of national professional organizations, and the National Board for Professional Teaching Standards (2002) whose guidelines form the criteria by which teacher education programs are accredited by the National Council for Accreditation of Teacher Education.

Objective 1.0: Maintain 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 Table 1 for workshop descriptions. 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 a classroom, faculty, student, or family survey, depending on which group the user identified on the Registration Form.

Table 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.

Website Design, Content, and Accessibility

EC-TIIS 3 Website Designer made website design improvements based on user feedback on the Website Evaluation form. Templates were created for each workshop and major area of the site to facilitate the updating process. Externally linked cascading style sheets, level 2 (CSS2) were implemented throughout the new design to lessen page weight and provide greater accessibility. All pages were designed to allow viewing without the style sheet. Headers were added to break up content into smaller information blocks.

The Website Designer made numerous improvements to the site's navigation. A skip navigation link which skips repetitive content was added to each page to assist users with visual impairment using text readers. Text "breadcrumbs" were added to each page to provide readers a visual cue as to where they are located in the site.

EC-TIIS staff continued to update links on the website and checked that content remained current. Updates were made as needed. Since content is based on developmentally appropriate materials developed at the Center, the workshops reflect evidence-based practices.

The website validates for HTML 4.01 W3C DTD guidelines, meeting accessibility requirements.

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 [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

EC-TIIS staff continued to review website content and features during Phase 3. *Workshop Evaluation* data which includes feedback on appearance, navigation, and content was reviewed on an ongoing basis. See page 23 for a summary of the results. Website revisions were made as needed. EC-TIIS website meets W3C accessibility guidelines.

Discussion Board

EC-TIIS Programmer created script to randomly assign registered users to the Discussion Board. He also created sessions and tracking to allow randomly assigned users to access the Discussion Board through internal workshop links. Two EC-TIIS targets concern the assignment of participants to the Discussion Board. Both targets were met. All faculty and students (Study 3 participants) were allowed access to the Board so that it could be used for class online discussions. All other individuals were randomly assigned to either Discussion Board or no Discussion Board when they initially registered on the website. Over the past 3 years, 1176 users were given access to the Discussion Board. Although EC-TIIS staff posted several discussion questions, only 158 responses were posted by users, 148 (94%) of which were course requirement posts. No users initiated new questions or topics.

Online Data Measures and Collection Procedures

Based on lessons learned concerning online data collection in EC-TIIS Phase 2, new forms were created during Year 1 for *Registration*, *Technology Survey*, *Classroom Use of Technology*, and *Family Use of Technology* to reflect changes identified by the research. Questions were reorganized according to their format (e.g., *yes – no*, *checklist, rating scales)* for ease of use by participants. EC-TIIS 2 data indicated participants rarely submitted comments on these initial forms; therefore, items related to general comments, questions, and concerns were collapsed into one open-ended item. Wording on some items was changed to make question format parallel.

To prepare for collecting data related to credit options, new forms, including the *Exit Survey* and *CPDU Form*, were created and added to the Progress Page. The *Exit Survey* consists of four open-ended questions which ask the participant about skills and knowledge gained; how these skills and knowledge will be applied to the learning environment; what benefits have been seen in children; and how the participant's program will benefit from his/her participation in the workshop.

Several changes were also made in the online data collection system to insure more complete data collection. The first change concerned the *Workshop Pre-Assessments*. Staff realized that requiring participants to complete all *Workshop Pre-Assessments* before entering any of the workshops would guarantee more complete sets of data. To insure participants completed all of the pre-assessments, staff decided to combine all nine assessments into one format. Participants have the option of completing all of the pre-assessments before entering a workshop or they can return to this form the next time they log in to the website. Only the style and format changed, the rating scale and content for the pre-assessments remained the same. EC-TIIS Programmer made revisions to the online procedures to reflect these changes.

A second change was mandatory completion of all questions on the online measures. In the past, many participants left survey questions unanswered. The EC-TIIS Programmer 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 shown which item is incomplete. After all questions are answered, the user is allowed access to the workshops. This change resulted in more complete sets of survey data.

A third change concerned the *Classroom Use of Technology Survey*. Since some educators do not have classrooms, they could bypass the classroom survey. EC-TIIS Programmer added a page before the survey asking if the participant currently teaches in a classroom environment. If the person answers no, then he/she bypasses the classroom survey. Survey results were more accurate as a result of this change.

An additional educator survey, *Classroom Implementation Survey*, was created to obtain follow-up data from educators. The survey is based on the *Classroom Use of Technology* and serves as a post version with all questions, except one involving the classroom physical environment, remaining the same. On the first survey, educators are asked to describe their classroom environment, and on the post version, they are asked what changes they have made in their classroom.

Registration and surveys forms were re-coded for importing data into CSV files for spreadsheet programs (e.g., *Excel*) and statistical programs (e.g., *SPSS*). Due to the revised data collection system being implemented in April 2005, data collected between the start of EC-TIIS 3, October 1, 2004, and April 1, 2005, was not included in this summary and analysis.

Professional Development Credit Awards

Certificate of Completion. A certificate was created in summer 2005 for participants who requested proof of workshop completion. The certificate contains EC-TIIS logo watermark and signatures of the Co-Director and Research Associate. The participant's name, hours per workshop completed, and number of total credit hours earned were printed on the certificate, which was then sent in PDF format via e-mail to the participant. Participants could request a Certificate of Completion if they met all workshop requirements which included completing the *Post Assessment* and *Exit Survey* for each workshop and one *Workshop Evaluation*. Once the Research Associate verified that requirements were met, a PDF file containing the personalized certificate was sent via e-mail to the participant. Participants could request a Certificate for any number of workshops. Table 2 contains the number of Certificate requests per workshop.

Table 2. EC-TIIS Professional Development Credit Awards

Workshop	Certificate	CPDU	CEU	Total
Adaptations	18	8	5	31
Computer Environment	19	8	5	32
Curriculum Integration	17	10	5	32
Emergent Literacy	31	10	5	46
Expressive Arts	17	9	5	31
Family Participation	20	7	5	32
Math, Science, Social Studies	17	9	5	31
Software	15	7	5	27
Technology Assessment	13	7	5	25
Total	167	75	45	287

Credit options. EC-TIIS staff established credit options with WIU’s Non-Credit Programs, WIU's Instructional Design and Technology (IDT) Department, and the Illinois State Board of Education (ISBE). These options included Continuing Education Units (CEUs), graduate credit, and Continuing Professional Development Units (CPDUs).

In September 2005, EC-TIIS Co-Director met with WIU’s Director of Non-Credit Programs and the Department Chair of IDT to discuss offering Continuing Education Units (CEUs) and graduate credit for participation in the online workshops. An agreement was signed by Non-Credit Programs and the Center for Best Practices in Early Childhood to offer two CEUs for workshop completion. WIU’s IDT Department offered three semester hours of graduate credit through its IDT 573 course for EC-TIIS participation beginning in June 2006.

Since the Center is an approved provider of Illinois CPDUs, no contract was needed with ISBE to offer CPDUs for the online workshops. The only requirement for ISBE was completion of a specific evaluation form which can be printed or downloaded from the EC-TIIS website. Participants from other states requested approval for the CPDUs from their state education departments.

During Year 1, staff determined requirements for each of the professional development credit options and established evaluation criteria for all required written work. Beginning in October 2005, information on the four professional development credit awards (Certificate of Completion, CEUs, CPDUs, and graduate credit) was made available to participants on the FAQ (Frequently Asked Questions) page of EC-TIIS website <http://www.wiu.edu/ectiis/faq.html>.

Between October 2005 and January 2008, 63 individuals requested and received professional development credit. Table 3 shows the number of requests received per workshop and credit type. Two individuals earned and received IDT graduate credit. A summary of educator data obtained from those receiving CPDU, CEU, and graduate credit can be found under Objective 3.0.

Objective 2.0: Implement Research Plan to Study the Effectiveness of the Approach and its Sustained use in Multiple Complex Settings According to a Variety of Contextual Factors

Data Collection

One EC-TIIS target was to collect registration and baseline data on all participants. That target was met. Revisions were made in the data collection system to insure that all survey questions were answered and all *Workshop Pre-Assessments* completed before participants entered any of the workshops. The revised data collection system was started in April 2005. In a 32-month period between April 1, 2005 and January 9, 2008, 1634 participants registered and completed baseline data forms. Analysis of registration and baseline data can be found on pages 22-31.

Another EC-TIIS target was to collect post-assessment data on individuals requesting credit. That target was met. Individuals seeking credit are required to complete all of the *Workshop Post-Assessments* in addition to an *Exit Survey* for each of the workshops. Analysis of pre and post assessment data for April 1, 2005 – January 9, 2008, can be found on pages 32-40.

At the end of each school year, a follow-up questionnaire was sent via e-mail to Study 3 faculty. Faculty responded to questions concerning which online workshops they used in their classes; a brief description of the courses in which they incorporated the EC-TIIS workshops; how they and their students benefited from the workshops; their plans for using the workshops next year; and recommendations for other faculty who will be using EC-TIIS for the first time. In Years 1 and 2, responses were received from seven faculty members from University of Tennessee, Eastern Michigan University, Western Illinois University, and Lincoln Christian College (Illinois) who had participated in Phase 2. Faculty used the EC-TIIS workshops as supplements to coursework in Special Education, Early Childhood, and Instructional Technology and Telecommunications. At the beginning of Year 3, EC-TIIS Co-Director sent an informational flyer containing strategies for using the online workshops in coursework to 69 faculty who had registered on the website. At the end of the year, a questionnaire was sent to the same faculty members. Staff received responses from 16 faculty. Results can be found in Objective 3.0, beginning on page 52.

Three hundred eighty-two (382) students registered on EC-TIIS during the 2005-2008 school years. A brief questionnaire was distributed to university students who used EC-TIIS workshops in one of their courses. Students answered four open-ended questions about time spent reviewing the workshops, benefits they received from workshop participation, and their perceptions of the effects participation will have on their future teaching. Staff received responses from 62 undergraduates and 27 graduate students, all from Early Childhood courses. A summary of the results for students and faculty can be found under Objective 3.0 on pages 52-56.

Objective 3.0: Analyze and Summarize Data to Determine Effectiveness of EC-TIIS Workshops

Website Design and Content Data

One EC-TIIS target was to have at least 90% of participants agree that the website design is of high quality. Another target was that at least 90% of participants agree that content is current and reflects developmentally appropriate practice. Both targets were met. At least 91% of individuals completing the *Workshop Evaluation* strongly agreed or agreed on all items related to website appearance, navigation, and content. See Table 3 for details**.**

Two hundred forty (240) participants responded to the online *Workshop Evaluation* between April 1, 2005 and January 9, 2008. The survey is mandatory for participants who want a Certificate of Completion, Continuing Education Units (CEUs), Continuing Professional Development Units (CPDUs), and graduate credit. Each participant who wants to receive some type of credit, must complete one *Workshop Evaluation*. Participants evaluated nine items covering Appearance, six related to Navigation, and eight related to Content. At least 92% of respondents marked *Strongly Agree* or *Agree* for all items.

Although the *Workshop Evaluation* is a 5 and 4-point rating scale, two categories were collapsed during the analysis. In Category A, Workshop Use, *Very Comfortable* was collapsed with *Comfortable*, while *Very Uncomfortable* was collapsed with *Uncomfortable*. In Categories B, C, and D only five participants (2%) selected *Strongly Disagree* for any of the items on the form. These items were: *Text is planned well for reading and printing* (1); *Graphics are fast loading* (1); *Links work* (2); and *Links are easily identified and labeled clearly* (1). These were the only *Strongly Disagree* responses on the survey and were collapsed into *Disagree*. Since some participants did not respond to all of the items, an *N/A* column was added.

Respondents' comments included: *Excellent resource materials in pdf's to download--I have used a ton of printer ink and paper*!!!! ; *Good workshop for pre-school educator in a school situation*; *Great job. This will help us put together training modules for our state TA program*; *I enjoyed reading this site and I feel I have learned more about emergent literacy*; *I enjoyed taking this online workshop. I learned a lot; am sure that I can use it in my teaching career. Thank you*; *I have found one idea that I will begin tomorrow for my Pre-K school and that is using a take-turn log that the children use themselves. It is a concept that is simple and makes you say, 'Yeah, I should have thought of that*'; and *I thought all the workshops were great!*

Table 3. Web Site Evaluation Results (April 1, 2005 – January 9, 2008) N=240

Category A – Workshop Use	**Comfortable**		**Average**		**Uncomfortable**		**N/A**	
Typing on a keyboard	87.9%	211	7.5%	18	3.8%	5	.8%	2
Viewing Web Page	91.3%	219	3.8%	9	4.2%	10	.8%	2
Downloading Images	85.4%	205	7.5%	18	5.9%	14	1.3%	3
Downloading & viewing PDF files	84.2%	202	9.2%	22	5.9%	14	.8%	2
Sending Email	91.3%	219	2.1%	5	5%	12	.4%	4
Category B – Appearance of Site	**Strongly Agree**		**Agree**		**Disagree**		**N/A**	
Site is user friendly	60.8%	146	37.5%	90	1.3%	3	.4%	1
Initial page captures user's attention	39.6%	95	52.9%	127	7.1%	17	.4%	1
Fonts are easy to read	61.3%	147	36.3%	87	.8%	2	1.7%	4
Text is planned well for reading and printing	56.3%	135	39.2%	94	2.9%	7	1.7%	4
Graphics are fast loading	56.3%	135	41.7%	100	1.7%	7	.4%	1
Graphic content is appropriate to site	61.3%	147	38.3%	92	0	0	.4%	1
Graphic Design is appealing	46.7%	112	49.6%	119	3.3%	8	.4%	1
Tables or Lists enhance readability	54.6%	131	42.1%	101	2.5%	6	.8%	2
Graphics complement content	52.9%	127	45.8%	110	.4%	1	.8%	2
Category C – Navigation of Site	**Strongly Agree**		**Agree**		**Disagree**		**N/A**	
Adequate site map is easy to find	47.1%	113	47.5%	114	2.9%	7	2.5%	6
Headings are descriptive of content	61.7%	148	36.3%	87	0	0	2.1%	5
Links work	56.7%	136	35.4%	85	6.6%	16	1.2%	3
Links are easily identified and labeled clearly	62.9%	151	33.8%	81	1.2%	3	2.1%	5
Site is easy to navigate	57.1%	137	35.4%	85	5.4%	13	2.1%	5
Main page is easy to return to	57.9%	139	35.8%	86	3.3%	8	2.9%	7
Category D – Site Content	**Strongly Agree**		**Agree**		**Disagree**		**N/A**	
Workshop meets the needs of the targeted audience	49.2%	118	48.3%	116	1.7%	4	.8%	2
Workshop content addresses the topic thoroughly	53.3%	128	41.7%	100	3.8%	9	1.3%	3
The content reflects developmentally appropriate practice	56.3%	135	42.1%	101	.8%	2	.8%	2
Information is presented objectively	54.6%	131	42.9%	103	1.7%	4	.8%	2
Materials are current	55.8%	134	41.7%	100	1.3%	3	1.3%	3
Terminology is current	57.1%	137	42.1%	101	0	0	.8%	2
Information is organized effectively	56.3%	135	40%	96	2.5%	6	1.3%	3

When asked which workshop(s) they reviewed, most of the 240 respondents selected more than one workshop. The most frequently selected workshop was Computer Environment (*n*=220, 91.7%), followed by Software (*n*=218, 90.8%), Math, Science, Social Studies (*n*=212, 88.3%), Family Participation (*n*=204, 85%), Technology Assessment (*n*=204, 85%); Expressive Arts (*n*=194, 80.8%); Emergent Literacy (*n*=181, 75.4%); and Adaptations (*n*=145, 60.4%).

Registration and Initial Survey Data

Between April 1, 2005 and January 9, 2008, 1634 individuals registered and completed baseline data on the website. Of those who registered, 43 registered twice and 5 registered three times. Reasons individuals registered more than once included: (1) They forgot their password or other vital sign-in information; (2) they used a different email address (some individuals had 3 different email addresses and they wanted to make sure they were registered with all of them); (3) they moved and changed positions (therefore, they re-registered); (4) they registered twice in a day; and (5) they registered using someone else's email address.

A review of registration data from April 1, 2005 to January 9, 2008, indicates of the 56 states and territories of the United States, 50 locations were represented. American Samoa, Guam, Missouri, North Dakota, Puerto Rico, and Virgin Islands were the only locations that had no EC-TIIS participants. Participants also came from 42 other countries, including 25 from Canada. The top 11 states with registrations are listed in Table 4.

Table 4. Top State Locations of EC-TIIS Participants, April 1, 2005 – January 9, 2008 (N=1,634)

State	*n*	Percent
Illinois	380	23.3
Florida	138	8.4
North Carolina	114	7
Ohio	76	4.7
California	68	4.2
New York	67	4.1
Michigan	64	3.9
Texas	45	2.8
Arizona	43	2.6
Pennsylvania	36	2.2
Kentucky	34	2.1

Participants' Profile. Of the 1634 registrants, 382 (23%) were University Students, 275 (17%) Early Childhood Educators, 169 (10%) Administrators, 167 (10%) Early Childhood Special Educators, 128 (8%) Child Care Providers, 121 (7%) University Faculty, 43 (3%) Support Personnel, 36 (2%) family members, 35 (2%) Head Start teachers, 23 (1%) Program Assistants, and 255 (16%) categorized themselves as 'Other.'

Of the 382 participants identifying themselves as students, 144 (9%) were from Western Illinois University, 29 (2%) from Eastern Michigan University, 17 (1%) from Lincoln Christian College, 7 (.4%) from the University of Tennessee. These four institutions continued their involvement with EC-TIIS from Phase 2. In addition, students from DePaul University, University of Louisville, Northern Arizona University, Blue Ridge Community College, and 81 other universities and community colleges participated in EC-TIIS from 2005-2008.

Early childhood educators, administrators, and support personnel came from 404 different schools or programs. Family members came from 19 different states.

When asked initially what kind of information was of interest to them, 1069 (65.4%) participants indicated Curriculum Integration. Next was Emergent Literacy (*n*= 990, 60.6%), followed by Family Participation (*n*=940, 57.5%), Adaptations (*n*=898, 55%), Expressive Arts (*n*=766, 46.9%), Math, Science, and Social Studies (*n*=714, 43.7%), Technology Assessment (*n*=686, 42%), Software (*n*=661, 40.5%), and Computer Environment (*n*=656, 40.1%).

***Technology Survey* Results**. All EC-TIIS participants are required to complete the *Technology Survey* as part of the registration process. Data from 1,634 participants was analyzed and summarized for this report. The following summary is based on participants' replies. Responses to the statement *Technology is a valuable teaching and learning tool for young children*, were collapsed for analysis. *Strongly Agree* was collapsed with *Agree* and *Strongly Disagree* with *Disagree*. Results showed 1,463 (89.6%) of the respondents agreed that technology was a valuable teaching and learning tool, while 104 (6.3%) disagreed. Sixty-seven (4.1%) of the respondents had *No Opinion*.

Most participants (*n*=1380, 84.5%) had access to the Internet via home, followed by the library (*n*=1249, 76.4%), university (*n*=1163, 71.2%), classroom (*n*=1071, 65.5%), and work (*n*=834, 51%). Only 355 (21.7%) 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 Digital Assistants (PDAs). Table 5 contains a summary of participants' responses.

Table 5. Participants' Computer Skills (N=1634)

Computer Skill	***n***	**Percent**
Sending or receiving attachments from email	1526	93.4
Creating word processing documents	1496	91.6
Downloading digital picture from a camera	1479	90.5
Installing or removing applications from the computer	1225	75
Using a personal PDA	1221	74.7
Using a scanner	1207	73.9
Burning a CD	1160	71
Using other computer applications	1131	69.2
Creating a personal website	1076	65.9
Manipulating/altering digital pictures	1008	61.7

Over half of the respondents, (*n*=1021, 62.5%) expressed a need for more technology training. Participants indicated that they wanted curriculum integration training the most (*n*=1069, 65.4%), followed by emergent literacy (*n*=972, 59.5%), technology assessment (*n*=911, 55.8%), and math, science, and social studies (*n*=911, 55.8%), computer environment (*n*=895, 54.8%), adaptations (*n*=883, 54%), software (*n*=859, 52.6%), and expressive arts (*n*=859, 52.6%).

When asked to rank their experience in using the Internet, 692 (42.4%) individuals ranked themselves as average, while 689 (42.2%) participants ranked themselves as above average. Only 156 (9.5%) individuals considered themselves experts. Other responses included below average (*n*=76, 4.7%) and no opinion (*n*=21, 1.3%).

***Classroom Use of Technology* Results**. All participants who were educators in a classroom were required to complete the *Classroom Use of Technology* survey. Three hundred and fifty-five (355) educators completed the survey. The average number of years teaching was calculated at 11.6 years. Two teachers had taught for 31 years, while 50 teachers had taught for only one year. Eighty (22.5%) teachers indicated they had an all day program, and 80 (22.5%) teachers said they had a half-day program. One hundred ninety-five (55%) teachers did not make a program selection. The total number of children served in the morning classes was 7,118; in the afternoon classes was 7,312, and in all day programs was 6,864. The total number of children served was 21,294, of which 2,556 (12%) were children with special needs.

Teachers were asked to indicate the technologies they had available for their classroom. Table 6 lists their responses.

Table 6. Technologies Available for Classroom (N=355)

Technology	***n***	**Percent**
Computer	318	89.6
Printer	255	71.8
Internet Access	222	62.5
Digital Camera	220	62
Email	203	57.2
Electronic Learning Toy	163	45.9
CD Burner	112	31.5
Scanner	90	25.4
Video Camera	75	21.1
Personal Digital Assistant	23	6.5
Web Cam	15	4.2

Even though teachers may have equipment available to them, EC-TIIS wanted to know what technologies they *actually use* within the curriculum. Table 7 shows teacher responses differed for the two questions. For example, 318 teachers said they had computers in the classroom, but 36 fewer (282) indicated that they actually used the computer in the classroom. As shown in Table 7, all responses to the question about what was actually used were less than the responses shown in Table 6, except for Email, which increased. The reason may be that participants confused Internet Access and Email in the first question.

Table 7. Technologies Used Within Curriculum (N=355)

Technology	*n*	Percent
Computer	282	79.4
Email	237	66.8
Printer	224	63.1
Digital Camera	197	55.5
Internet Access	192	50.4
Electronic Learning Toys	139	39.2
Scanner	65	18.3
CD Burner	58	16.3
Video Camera	48	13.5
Personal Digital Assistant	13	3.7
Web Cam	9	2.5

On the initial survey, less than half the teachers (*n*=129, 36.3%) indicated that they integrate technology with other types of activities in their classroom and only 67 (18.9%) teachers use websites for teaching resources.

The average number of adult software available for classrooms was 2.37 and the average number of children software available for classrooms was 5.52. Edmark programs (*Thinkin Things*, *Bailey's Book House*, and *Sammy Science House*) were the most popular (13.6%) followed by *Jump Start* (10%), *Reader Rabbit* (8.6%), *KidPix* (4.7%) and Disney and Preschool Programs (4.1%). See sample programs in Table 8.

Teachers were asked about adaptive equipment, such as the IntelliKeys, a touch sensitive device that can be used with overlays or as switch input, and Discover: Kenx, an adaptive interface which can be set up for switch or touch tablet use. Only 135 (38.3%) teachers indicated that they used adaptive equipment in the classroom. Types of adaptive equipment available to the classroom included the adaptive mouse (*n*=30, 22.5%), augmentative communication device (*n*=21,15.5%), switches (*n*=20, 14.9%), touch screen (*n*=19, 13.8%), IntelliKeys (*n*=17, 13%), switch input box (*n*=10, 7.6%), and Discover:Kenx (*n*=3, 2%). Not all teachers used adaptive equipment available to them. The adaptive mouse was used most often, followed by switches, touch screen, augmentative communication device, IntelliKeys, switch input box, and Discover:Kenx.

When asked if they participated in a technology assessment for a child in their classroom, 295 (83%) teachers indicated they never participated in an assessment. Of the 60 (17 %) teachers who participated in a technology assessment, 12 (20.8%) of them also included family members.

Table 8. Software Programs Available in the Classroom (N=339)

Software program	Frequency	Percent
Edmark programs	46	13.6
Jump Start	34	10.0
Reader Rabbit	29	8.6
Kid Pix	16	4.7
Disney Programs	14	4.1
Preschool Programs	14	4.1
Living Books	12	3.5
Microsoft Office	11	3.2
IntelliKeys Programs	10	2.9
Boardmaker	9	2.7
Scholastic	9	2.7
Kid Desk	7	2.1
Dr. Seuss	7	2.1
Blues Clues	7	2.1
Accelerated Programs	6	1.8
Laureate Software	5	1.5
Earobics	5	1.5
Paint	4	1.2
Leap Frog	4	1.2
Phonics	4	1.2
Sesame Street	4	1.2
Breakthrough To Literacy	4	1.2

In response to a question about when the computer was used in the classroom, most of the teachers (*n*=182, 51.3%) indicated that they used the computer during free play. Other responses included center time (*n*=160, 45.1%), small group (*n*=109, 30.7%), individual instruction (*n*=104, 29.3%), and curriculum instruction (*n*=82, 23.1%).

When asked what technologies children use in the classroom, teachers indicated: computer (*n*=254, 71.5%), electronic learning toys (*n*=115, 32.4%), printer (*n*=79, 22.3%), Internet (*n*=65, 18.3%), digital camera (*n*=38, 10.7%), email access (*n*=17, 4.8%), CD burner (*n*=12, 3.4%), scanner (*n*=18, 5.1%), video camera (*n*=10, 2.8%), web cam (*n*=4, 1.1%) and PDA's (*n*=2, .6%).

Only 103 (29%) teachers allowed their children to handle classroom software independently. The computer was used on average a little over four days/week. The average amount of time the computer was used in the classroom by children was 29.52 minutes/day.

As shown in Table 9, *Never/Rarely* and *Often/Always* were collapsed for analysis of the question, *During computer time, how often do children in your classroom do the following? Strongly Disagree /Disagree* and *Strongly Agree/Agree* were collapsed when teachers were asked to rate children's behavior while they are at or near the computer. Table 10 displays the results. Over half the teachers agreed that young children comprehend and respond to story based software; show appreciation for stories and reading; gain meaning by listening to the stories from the computer; demonstrate awareness of computer rules and routines; and use the computer materials and equipment carefully. Almost half agreed that children use the computer as a tool for investigation.

Table 9. How Children Use the Computer in the Classroom. N=355

	#	**Percent**	**#**	**Percent**	**#**	**Percent**	**#**	**Percent**
	Often/Always		**Sometimes**		**Never/Rarely**		**No Response**	
By Themselves	151	42.6	71	20	111	31.3	22	6.2
With One Other Child	153	43.1	80	22.5	100	28.1	22	6.2
With 2 or More Children	68	19.2	73	20.6	192	54.1	22	6.2
At Computer with Adult	130	36.6	104	29.3	99	27.9	22	6.2

Table 10. Children's Behavior and Time at the Computer (N=355)

	#	**Percent**	**#**	**Percent**	**#**	**Percent**	**#**	**Percent**
	Agree		**Undecided**		**Disagree**		**No Response**	
Comprehend and respond to story based software.	216	60.8	92	25.9	25	7.1	22	6.2
Show appreciation for stories and reading.	226	63.6	84	23.7	23	6.4	22	6.2
Gain meaning by listening to the story from the computer.	219	61.7	94	26.5	20	5.7	22	6.2

Use the computer as a tool for investigation.	176	49.6	94	26.5	63	17.7	22	6.2
Demonstrate awareness of computer rules and routines.	208	58.5	87	24.5	38	10.7	22	6.2
Use the computer materials and equipment carefully.	201	56.6	93	26.2	39	10.1	22	6.2

Table 11 displays information on what children are doing while at or near the computer. Interacting with peers (58.9%) ranked the highest, followed by exploring programs (53%). One hundred seven (30.1%) teachers indicated children make a connection between software content and curricula areas. Concerning the popularity of the computer center, 179 (50%) of the educators rated it high; 99 (28%) rated it medium; and 55 (15%) rated it low. Twenty-two (6.2%) educators did not respond to the question.

Table 11. What Children Do While At or Near the Computer as Reported by Teachers (N=355)

	#	Percent
Interacting with peers	209	58.9
Exploring programs	188	53
Interacting with stories	164	46.2
Interacting with adults	157	44.2
Problem solving	136	38.3
Interacting with play materials	85	23.9
Singing	84	23.7
Drawing	75	21.1
Printing	53	14.9
Dancing	39	11

A post version of the *Classroom Use* survey was completed by 25 educators. Results can be found on pages 41-42.

***Family Survey* Results.** Thirty-five family members from 20 different states completed the *EC-TIIS Family Survey*. When asked how much time children spent using technology at home, responses ranged from 10 minutes per day to 3-4 times per week, to a couple of times a year. Most participants reported that the computer was used for printing pictures and making greeting cards. One family member added a comment about his/her child: *He really enjoys sitting with the keyboard and watching things happen on the screen or hearing fun sounds with a hit of a key or an alternative keyboard.*

When asked what technologies their children used outside of the classroom, 27 family members indicated the computer was used, while 20 reported their child used electronic learning toys, 16 indicated Internet access was used by their child. Table 12 contains data on all technologies reported. In 14 (40%) of the families, children use software independently, while 31 (88.6%) families use software with their children. Table 13 contains family reports concerning activities their children did while at or near the computer.

Fourteen (40%) family members reported that their children use the computer to create things while 10 (28.6%) families said their children make a connection between software and everyday activities. Families provided some examples of what children created when using the computer.

- *Pictures (3)*
- *Scribbling and attempting to draw pictures with mom and brother*
- *They create sentences, pictures words, designs, drawings, music notes, etc.*
- *Birthday invitations and books*
- *She uses a drawing program to make pictures and she colors pictures online*
- *Games - creating virtual environments pets, etc.*

Table 12. Technologies Used by Child Outside of Classroom as Reported by Family (N=35)

Technology Item	**Yes**	**%**	**No**	**%**
Computer	27	77.1	8	22.9
Electronic Learning Toys	20	57.1	15	42.9
Internet Access	16	45.7	19	54.3
Printer	11	31.4	24	68.6
Digital Camera	10	28.6	25	71.4
Email	6	17.1	29	82.9
Video Camera	5	14.3	30	85.7
CD Burner	4	11.4	31	88.6
Scanner	3	8.6	32	91.4
Personal Digital Assistant	1	2.9	34	97.1
Web Cam	1	2.9	34	97.1

Table 13. Family Report of Activities Child Does While At or Near Computer (N=35)

Item	**Yes**	**%**	**No**	**%**
Exploring Programs	16	45.7	19	54.3
Interacting with Play Materials	16	45.7	19	54.3
Interacting with stories	16	45.7	19	54.3
Drawing	15	42.9	20	57.1
Interacting with Adults	13	37.1	22	62.9
Singing	11	31.4	24	68.6
Interacting with Peers	9	25.7	26	74.3
Printing	9	25.7	26	74.3
Problem Solving	8	22.9	27	77.1
Dancing	6	17.1	29	82.9

Family members observed the following when the child made a connection between software content and everyday activities:

- *Following directions (2)*
- *Math programs have helped him with the subject in school*
- *Recognizes images she learned on programs*
- *Flowers that grow, animals, and letters*
- *He lives much of his life in a virtual way via computer as he has severe spastic quad CP. He accesses it through his communication device with a Tracker and is on the computer all day.*

Families rated the popularity of the computer for their children as a little above average, 3.45 out of 5. Only 13 (37.1%) family members participated in a technology assessment for their child. Their comments include:

- *My child has been diagnosed as dysgraphic so handwriting will always be a weakness. We are trying to provide him with technology to help bridge the gap*
- *We've had an assistive technology assessment, but have worked with several different AT devices such as a toggle switch, Big Mac, and Dynavox.*
- *Although we had a technology assessment early on, the gap is with the practical usage in day to day activities. Since the field of speech and language therapy has multiple disciplines many of them are quickly forgotten when you start to talk about technology.*
- *The AT group in Colorado recommended an AAC device which we used for about 3 years but my son never really made the connection. It was too abstract. He is better at using objects to communicate or using his sounds.*

Workshop Pre and Post Assessment Data

The following workshop analyses and summaries are for the reporting period, April 2005 – January 2008. 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 76 participants completed both the pre and post assessments for the Adaptations Workshop. Comparisons for all six items were statistically significant. In addition, effect sizes of larger than 1 were found for all comparisons. See Table 14. The largest effect size was found for the knowledge item related to making a computer accessible for children with motor impairments.

Table 14. 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.	76	2.45	3.79	8.59[a]	1.33	(.97,1.67)
I know how the computer can be made accessible for children with motor impairments.	75	2.48	4.19	11.26[a]	1.72	(1.34,2.09)
I know how to evaluate a child's switch skills according to the "Levels of Switch Progression".	75	1.72	3.60	10.38[a]	1.64	(1.26,2.00)
Attitude						
Any child can benefit from an alternate input.	74	2.82	4.01	6.10[a]	.98	(.64,1.32)
Skills						
If needed, I could select an adaptive input device that is appropriate for an individual child.	75	2.15	3.69	8.62[a]	1.37	(1.01,1.72)
If needed, I could secure a switch in a stable position for a child.	76	1.93	3.87	11.82[a]	1.66	(1.28,2.02)

[a] $p<.001$

Computer Environment Workshop. A total of 72 participants completed both the pre and post assessments for the Computer Environment Workshop. Statistical significance was found for six of the seven items. Effect sizes ranged from -.06 to 1.19. The effect size of -.06 was found for the attitude item related to adults managing children's computer time. The decrease in score from pre to post is expected since this workshop places emphasis on children managing their own computer time. The minimal change may be due to participants' strong beliefs that children's computer use needs to be managed by adults at pre and that more exposure to the benefits of children managing their own computer use may be needed for greater changes in attitude. As shown in Table 15, the largest effect sizes of 1.18 and 1.19 were found for the two skill items which focus on evaluating a computer center and making CD-ROMs easily accessible to children.

Table 15. 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	72	3.25	4.18	5.49[a]	.83	(.49,1.17)
I know strategies to help encourage turn taking at the computer.	72	3.38	4.33	6.39[a]	.97	(.62,1.31)
I know materials and resources needed to make off-computer props, which relate to software content.	71	2.65	3.72	5.28[a]	.90	(.55,1.24)
Attitude						
Children's time at the computer should be carefully managed by an adult.	72	3.99	3.93	-.34	-.06	(-.38,.27)
Children can learn to handle software and operate the computer independently.	72	3.81	4.19	2.71[b]	.42	(.08,.74)
Skills						
I can evaluate a computer center for appropriate equipment placement and adaptations.	72	2.92	4.21	8.14[a]	1.18	(.82,1.53)
I can devise a method to make CD-ROMs easily accessible for children.	71	2.85	4.21	7.33[a]	1.19	(.83,1.54)

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

Curriculum Integration Workshop. A total of 56 participants completed the pre and post assessments for the Curriculum Integration Workshop. Statistical significance was found for all six items. Effect sizes ranged from .92 to 1.54, as shown in Table 16. The largest effect size of 1.54 was found for the knowledge item focusing on curriculum integration and the skill item focusing on integrating current ideas and materials into technology related activities.

Table 16. 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.	56	2.79	4.32	8.89[a]	1.54	(1.11,1.95)
I know how to use technology to develop off computer materials that can be used to integrate children's software into my curriculum.	56	2.50	4.11	7.72[a]	1.47	(1.05,1.88)
I know how to select appropriate software for use with thematic units.	56	2.80	4.09	6.37[a]	1.17	(.76,1.56)

Attitude						
Technology should be incorporated into the early childhood curriculum.	56	3.36	4.27	5.56[a]	.92	(.53,1.31)
Skills						
I can develop a plan that contains elements recommended for technology integration activities.	56	2.57	4.05	8.40[a]	1.54	(1.10,1.95)
I can integrate current ideas and materials into technology related activities in the classroom.	56	2.70	4.16	7.55[a]	1.52	(1.09,1.93)

[a]p<.001

Emergent Literacy Workshop. A total of 50 participants completed both the pre and post assessments for the Emergent Literacy Workshop. Statistical significance was found for all six items. Effect sizes ranged from .42 to 1.48. See Table 17. This largest effect size was for the skill item related to designing a technology activity to promote emergent literacy.

Table 17. 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.	50	2.80	4.02	5.96[a]	1.15	(.72,1.56)
I know how to adapt reading materials for a preschool child who has difficulty turning the pages of a book.	49	2.71	4.10	7.45[a]	1.33	(.88,1.76)
Attitude						
A sign-up method should be used to manage turn-taking at the computer, as well as promoting emergent literacy skills.	50	3.36	4.40	5.62[a]	1.02	(.60,1.43)
Using labels or environmental print in the classroom promotes emergent literacy.	50	3.86	4.56	3.46[b]	.66	(.26,1.06)
Skills						
I can design a technology curriculum activity to promote emergent literacy.	49	2.59	4.06	7.68[b]	1.48	(1.02,1.92)
I can arrange the environment so that children have easy access to books and writing materials.	50	3.96	4.36	2.27[c]	.42	(.02,.81)

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

Expressive Arts Workshop. A total of 42 participants completed both the pre and post assessments for the Expressive Arts Workshop. Statistical significance was obtained for all nine items. The effect sizes, shown in Table 18, ranged from .53 to 1.09. The largest effect size was for the knowledge item related to developmentally appropriate art activities.

Table 18. 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.	42	2.74	4.00	5.13[a]	1.03	(.57,1.47)
I know how to determine and implement developmentally appropriate art activities into a program.	42	3.00	4.19	5.14[a]	1.09	(.62,1.53)
I can recognize children's art at different developmental stages.	42	3.00	4.14	4.91[a]	.98	(.52,1.43)
I know some benefits for the visual arts in early intervention programs.	42	2.95	4.14	4.93[a]	.95	(.49,1.40)
Attitude						
Expressive arts offer important opportunities for expression, problem solving, and communication.	42	3.71	4.69	4.62[a]	.94	(.48,1.38)
Expressive arts contributes to healthy development and learning.	42	3.88	4.62	3.89[a]	.77	(.32,1.21)
Expressive arts contributes to written and spoken communication and enhances social development.	42	3.86	4.50	3.40[b]	.63	(.18,1.06)
Teacher-assisted art activities are the most appropriate for all children in preschool.	41	2.95	3.66	2.61[c]	.53	(.08,.96)
Skills						
I can plan appropriate child-directed activities in drawing and painting for children demonstrating different developmental levels.	42	3.36	4.26	4.71[a]	.82	(.37,1.26)
I can arrange the physical environment for drawing, painting, and three-dimensional activities.	42	3.48	4.50	4.97[a]	1.02	(.55,1.46)

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

Family Participation Workshop. A total of 33 participants completed the pre and post assessments 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. As shown in Table 19, the largest effect size was found for the knowledge item related to the levels of family participation for early childhood activities.

Table 19. 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.	38	2.92	4.11	5.95[a]	1.08	(.59,1.55)
I know several strategies to help increase family participation in preschool technology activities.	38	2.76	4.29	7.83[a]	1.45	(.93,1.94)
I know the important points to consider in developing a newsletter that includes technology-related information.	38	2.63	4.05	5.99[a]	1.22	(.72,1.70)
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.	38	3.66	4.47	3.77[b]	.80	(.32,1.26)
Attending a technology workshop is the best way for families to learn about how computers can be used with their children.	37	3.05	4.16	4.59[a]	1.06	(.57,1.54)
Skills						
I can plan and design a hands-on technology workshop for families of young children with disabilities.	36	1.97	3.92	9.40[a]	1.90	(1.32,2.43)
I can use a variety of techniques to evaluate family involvement in technology activities.	38	2.34	3.95	6.53[a]	1.46	(.94,1.95)

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

Math, Science, and Social Studies Workshop. A total of 40 participants completed the pre and post assessments for the Math, Science, and Social Studies Workshop. Statistical significance was found for all seven items. Effect sizes, shown in Table 20, ranged from .72 to 1.42. The largest effect size was for the knowledge item related to strategies for promoting problem solving at the computer.

Table 20. 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.	40	2.75	4.10	5.59[a]	1.11	(.63,1.57)
I know software programs that integrate social studies into the early childhood curriculum.	40	2.42	3.88	6.41[a]	1.23	(.74,1.69)
I know strategies that promote children's problem solvi skills at the computer.	40	2.55	4.15	7.58[a]	1.42	(.92,1.90)
Attitude						
Good math software contains at least one drill and practice activity to help children with early number concepts.	39	3.10	3.97	3.53[b]	.83	(.36,1.29)
Software that features a variety of cultures should be us to effectively teach young children about social studies.	39	3.62	4.38	3.07[b]	.72	(.25,1.17)
Skills						
I can adapt a computer activity for a young child to help promote early science skills.	40	2.72	3.90	4.31[a]	.95	(.48,1.40)
I can design curriculum activities using software and of computer materials to promote children's knowledge about community helpers (e.g. fire fighters, police officers, EMTs, Doctors).	40	2.68	4.20	5.17[a]	1.19	(.70,1.65)

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

Software Evaluation Workshop. A total of 41 participants completed both the pre and post assessments for the Software Evaluation Workshop. Statistical significance was obtained for all eight items. Table 21 shows results. Effect sizes ranged from .76 to 1.42. The largest effect size was found for the two knowledge items related to the levels of software interactivity and ways to use software with children.

Table 21. 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.	41	2.88	4.29	5.79[a]	1.31	(.82,1.77)
I know the levels of software interactivity.	41	2.54	4.12	6.70[a]	1.42	(.92,1.89)
I know a variety of ways that software can be used with children.	41	2.83	4.34	7.01[a]	1.42	(.92,1.88)
I know the benefits of using software with children.	41	3.29	4.51	5.94[a]	1.24	(.76,1.70)
Skills						
I am able to categorize software based on the levels of interactivity.	41	2.46	4.02	6.98[a]	1.33	(.84,1.79)
I can effectively evaluate software for use with children.	41	2.88	4.17	5.17[a]	1.10	(.63,1.55)
Attitude						
All software designed for children is beneficial.	41	2.15	3.05	3.66[b]	.76	(.30,1.20)
Software is most effective when children use it by themselves.	40	2.25	3.25	4.31[a]	.90	(.43,1.35)

[a]p<.001, [b]p<.01

Technology Assessment Workshop. A total of 32 participants completed the pre and post assessments for the Technology Assessment Workshop. Statistical significance was obtained for all nine items. Effect sizes, shown in Table 22, ranged from 1.47 to 2.06. The largest effect size was for the knowledge item related to the participants in a technology assessment.

Table 22. 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.	32	2.88	4.50	7.76[a]	1.63	(1.04,2.17)
I know the procedures of a technology assessment.	32	2.34	4.19	7.03[a]	1.82	(1.22,2.38)
I know what materials are needed for a technology assessment.	32	2.25	4.22	7.58[a]	1.92	(1.30,2.48)
I know who should be included in a technology assessment.	32	2.25	4.41	8.61[a]	2.06	(1.43,2.64)
I know what information needs to be gathered prior to a technology assessment.	32	2.19	4.31	7.81[a]	1.99	(1.37,2.57)
Skills						
I feel that I could contribute to an effective technology	32	2.38	4.12	5.69[a]	1.50	(.93,2.04)

assessment for a child.						
I can identify children who could benefit from a technology assessment.	32	2.41	4.16	5.88[a]	1.47	(.90,2.00)
Attitude						
Technology assessments are a vital resource for children with disabilities.	31	2.71	4.52	6.05[a]	1.61	(1.02,2.16)
All children with disabilities can benefit from a technology assessment.	31	2.61	4.35	7.67[a]	1.76	(1.16,2.33)

[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). 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.

Study 2 Follow-Up Data

As teachers met criteria for Study 2, the completion of at least three workshops, they were asked to participate in another phase of the project involving qualitative data, including teachers' Action Plans, samples of child and classroom products, videos and digital pictures, and teachers' Interesting Incident Reports. Letters were sent to 64 teachers inviting them to participate in this next phase. Only one teacher responded. However she later decided that she did not have time to send data as required. In an effort to obtain follow-up data, and possibly child data, from educators who had participated in EC-TIIS, staff developed the *Classroom Implementation Survey*. The 355 participants who indicated they were teachers were sent a written notice via e-mail inviting them to complete the survey online. Twenty-five (7%) completed the survey. A comparison of the responses with the teacher's original survey responses yielded few and insignificant results. The survey results were instead summarized as a group with pre-post comparison noted on the last item.

***Classroom Implementation Survey* Results.** Analysis of the survey shows that a majority of the teachers have technology and use it in their classroom. When asked what technologies are used most often, 20 teachers (80%) indicated computer and printer, and 19 (76%) indicated digital camera. Five teachers (20%) have an adaptive mouse; 4 (16%) have both IntelliKeys and switches available in the classroom. Twenty-three teachers (92%) use websites as a resource.

Fifteen teachers (60%) integrate technology with other types of activities in their classroom. Examples include using Living Books software to reinforce literacy skills. One teacher commented, *I have bought software that goes along with some of the books that I read in the classroom. Children can actually explore the pages in the book.* Another teacher created digital talking books using *PowerPoint* to integrate technology into literacy activities. Another example focused on using *HyperStudio* to help children learn math concepts.

When asked about the ways children use the computer in the classroom, 16 teachers (64%) indicated that it was used during center time; 12 (48%) use it during free play, individual instruction, and in small groups equal amounts of time. A majority of the teachers (64%) agreed that children made a connection between software content and curricula areas. One teacher commented, *If children complete a problem solving task in a computer program, they will use the same technique in the math or science center to solve a similar problem.* Another commented, *Children will find a book, such as Stellaluna, in the reading area which they also used on the computer*. Another teacher wrote about observing children in the dramatic play center recreating a story from the computer.

Fifty-six percent (n=14) of the teachers agreed that children comprehend and respond to story-based software and use the computer as a tool for investigation. When asked what children do at or near the computer, 18 teachers (72%) indicated that children interacted with peers; 14 (56%) responded that children explore materials and problem solve; 13 (52%) indicated that children also interact with adults and with stories while at the computer.

When asked for examples of how the teacher integrated technology into expressive arts, literacy, math, science, and social studies, responses included: *Students create and print their own art work through KidPix*; *The students use HyperStudio to create stories. Sometimes we make a group pattern book. We have made our own version of The Three Pigs and Goldilocks and the Three Bears*; *We use camera to record science explorations and we use Internet sites to* *visit animals that can not be found I our local area*; and *Children use digital pictures to talk about social interactions*.

The teachers were asked about any changes they made in their classroom environment. One teacher moved her computer area into a regular rotation so that each child is given a turn at the computer at least three times a week. Another lowered her computer tables and let the children work more independently. One teacher who did not have room for a computer in her classroom prior to her participation in EC-TIIS, reported rearranging centers and adding a computer. One teacher switched from a regular mouse to an adapted one. Another made materials more accessible to the children and not as adult directed.

At the end of the survey participants were asked for any additional comments. Only three teachers made comments on the initial survey, mainly focusing on (1) the lack of money for technology, (2) the difficulty integrating technology with makeup of classroom; and (3) the belief that technology should only be used as a supplement to the curriculum. On the post version of the survey, the teacher who expressed difficulty with technology, commented *I feel technology has helped my students develop skills in all areas*. The teacher who said initially the computer is only a supplement commented, *Computers are highly needed in all classrooms. It is the way of the future. The sooner students have access and are taught proper use of the computer, the further along they will be when leaving our learning environment.*

***Exit Survey* Results.** Other Study 2 qualitative data includes answers to open-ended questions on the *Exit Survey*, required by teachers requesting professional development credit. Teachers were required to complete four open-ended questions for each workshop. Questions consisted of (1) *What knowledge and skills have you acquired?*; (2) *How will you apply the skills and knowledge to your learning environment?;* (3) *What benefits have you seen (or anticipate seeing) for children?*; and (4) *How will your program (school, day care facility, or center), home, or other learning environment benefit from your participation in this workshop?* A summary of the results according to each workshop follows.

One hundred thirty-four (134) participants completed *Exit Survey* questions for the **Adaptations Workshop.** When asked about knowledge gain following completion of the workshop, participants provided 178 responses which were coded into 27 different topics. The most common response involved knowledge of the different types of adaptations (20.2%). Other common knowledge items included knowledge of switches (13.5%) and knowledge of matching adaptive devices to the specific needs of children (10.1%).

When asked how the knowledge can be applied to their learning environment, participants provided 137 responses which were coded into 21 different applications. The most common application involved being able to match adaptations to the needs of children (17.2%). Other common applications involved accessing resources (16.4%), using adaptive devices (11.9%) and using switches (11.9%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 137 responses, resulting in 29 different benefits. The most common response involved the children's use of technology in the classroom (12.4%). Other commonly reported benefits included greater independence for children (10.9%), enhanced communication (8.8%), and beneficial use of switches (8.8%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 111 responses, resulting in 27 different benefits. The most common responses involved increasing the personal knowledge base regarding implementation of adaptations (18.9%) and being in a position to educate others regarding adaptations (18.9%). Other commonly reported benefits included the use of technology (12.6%) and access to resources (6.8%).

For the **Computer Environment Workshop**, *Exit Survey* data was gathered from 99 participants. When asked about knowledge gain following completion of the workshop, participants provided 153 responses which were coded into 30 different topics. The most common response involved knowledge of how to set up or organize a computer center (25.5%). Other common knowledge items included increased knowledge of computer environments (9.2%), knowledge of computer center management (6.5%) and knowledge related to children's independent use of the computer (6.5%).

When asked how the knowledge can be applied to their learning environment, participants provided 156 responses which were coded into 29 different applications. The most common application involved being able to organize or set up a computer environment (20.5%). Other common applications involved implementing ideas learned through the workshop (11.5%) and making the computer center accessible to children (8.3%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 70 responses, resulting in 20 different benefits.

The most common responses involved the children's independent use of the computer (14.3%) and improvements in social skills (14.3%). Another commonly reported benefit was children's improvements in learning skills (11.4%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 98 responses, resulting in 25 different benefits. The most common response involved the organization or set up of computer environments (16.3%).

Other commonly reported benefits included effective computer use (15.3%) and being able to educate others on workshop content (12.2%).

For the **Curriculum Integration Workshop**, *Exit Survey* data was gathered from 99 participants. When asked about knowledge gain following completion of the workshop, participants provided 108 responses which were coded into 19 different topics. The most common response involved knowledge of off computer support and materials (15.7%). Other common knowledge items included technology integration (12.0%) and software integration (10.2%).

When asked how the knowledge can be applied to their learning environment, participants provided 96 responses which were coded into 181 different applications. The most common application involved being able to integrate technology into the curriculum (26.0%). Other common applications involved integrating software into the curriculum (18.8%) and incorporating off computer support and materials (12.5%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 86 responses, resulting in 23 different benefits. The most common response involved improvements in the children's learning skills (20.9%). Other commonly reported benefits included enhanced technology use resulting from technology integration (10.5%), increased enjoyment (9.3%), and greater student access to the curriculum (9.3%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 65 responses, resulting in 18 different benefits. The most common responses involved being in a position to better educate others (16.9%) and enhanced curriculum integration (16.9%). Another commonly reported benefit included enhanced technology integration (12.3%).

Exit Survey data was gathered from 101 **Emergent Literacy Workshop** participants.

When asked about knowledge gain following completion of the workshop, participants provided 166 responses which were coded into 28 different topics. The most common responses involved knowledge of using adaptations in connection with emergent literacy (14.5%) and literacy rich environments (14.5%).

When asked how the knowledge can be applied to their learning environment, participants provided 134 responses which were coded into 30 different applications. The most common applications involved developing literacy environments (12.7%) and incorporating reading/writing into the curriculum (12.7%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 54 responses, resulting in 23 different benefits. The most common response involved positive effects on children's reading and writing (25.9%). Another commonly reported benefit included an improved learning environment (11.1%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 96 responses, resulting in 29 different benefits. The most common response involved being in a position to educate other professionals in their program (11.5%). Other commonly reported benefits included child benefits (8.3%) and enhanced technology use (8.3%).

Exit Survey data was gathered for 88 **Expressive Arts Workshop** participants. When asked about knowledge gain following completion of the workshop, participants provided 102 responses which were coded into 18 different topics. The most common response involved knowledge of the benefits of the arts in the curriculum (23.5%). Other common knowledge items included knowledge related to curriculum activities (12.8%) and gaining an overview of the current status of arts in early childhood (8.8%).

When asked how the knowledge can be applied to their learning environment, participants provided 98 responses which were coded into 16 different applications. The most common application involved being in a position to share the benefits associated with the arts with children (42.9%). Other common applications involved developing curriculum activities which incorporated the arts (19.4%) and incorporated movement into the use of music in the classroom (6.1%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 16 responses, resulting in 11 different benefits.

The most common response involved the children's awareness of the benefits of the arts (18.8%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 102 responses, resulting in 13 different benefits. The most common response once again involved shared knowledge associated with the benefits of the arts (53.9%). Other commonly reported benefits included gaining background knowledge regarding the arts (9.8%) and enhanced curriculum activities (8.8%).

For the **Family Participation Workshop**, *Exit Survey* data was gathered from 87 participants. When asked about knowledge gain following completion of the workshop, participants provided 96 responses which were coded into 17 different topics. The most common response involved knowledge related to involving family members in class activities (27.1%). Other common knowledge items included knowledge related to family technology workshops (19.8%) and ideas for increasing family participation (18.8%).

When asked how the knowledge can be applied to their learning environment, participants provided 107 responses which were coded into 13 different applications. The most common application involved enhancing family involvement (29.9%). Other common applications involved conducting family technology workshops (19.6%) and creating newsletters (16.8%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 77 responses, resulting in 20 different benefits. The most common response involved enhanced family involvement in child's education (23.4%). Other commonly reported benefits included improvements in teachers and families working together (18.2%) and children's better understanding of using technology 13.0%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 108 responses, resulting in 19 different benefits. The most common response involved increased family participation (19.4%). Other commonly reported benefits included better communication skills (13.0%) and better learning experience resulting from family/school collaboration (11.1%).

Exit Survey data was gathered from 80 **Math, Science, and Social Studies Workshop** participants. When asked about knowledge gain following completion of the workshop, participants provided 104 responses which were coded into 19 different topics. The most common response involved knowledge gained regarding best practices (23.1%). Other common knowledge items included knowledge related to technology integration (22.1%) and learning standards (10.6%).

When asked how the knowledge can be applied to their learning environment, participants provided 85 responses which were coded into 20 different applications. The most common application involved technology integration (21.2%). Other common applications involved integrating curriculum (11.8%) and best practices (9.4%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 64 responses, resulting in 27 different benefits. The most common response involved increased student learning (29.7%). Another commonly reported benefit was better technology use (17.2%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 75 responses, resulting in 21 different benefits. The most common responses involved technology integration (16%) and integration of social skills (16%).

For the **Software Evaluation Workshop**, *Exit Survey* data was gathered for 77 participants. When asked about knowledge gain following completion of the adaptations workshop, participants provided 157 responses which were coded into 20 different topics. The most common response involved knowledge of how to evaluate software (21.7%). Other common knowledge items included increase in general knowledge of software (13.4%) and knowledge related to the levels of interactivity (12.7%).

When asked how the knowledge can be applied to their learning environment, participants provided 133 responses which were coded into 18 different applications. The most common application involved benefitting children through effective computer use (15.8%). Other common applications involved evaluating software (14.3%) and selecting appropriate software (14.3%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 86 responses, resulting in a total of 19 different benefits. The most common response involved the children's computer use (20.9%). Other commonly reported benefits included access to software (10.5%), age/developmentally appropriate instruction (9.3%), and improved learning skills (9.3%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 73 responses, resulting in 21 different benefits. The most common response involved being in a position to better educate others regarding software selection/evaluation (19.2%). Other commonly reported benefits included the increase in knowledge regarding the use of software (16.4%) and the selection of appropriate software for classroom use (13.7%).

Exit Survey data was gathered for 66 **Technology Assessment Workshop** participants. When asked about knowledge gain following completion of the workshop, participants provided 59 responses which were coded into 10 different topics. The most common response involved simply knowledge related to awareness of the existence of technology assessments (59.3%). Another common knowledge items included knowledge related to organizing a technology assessment (11.9%).

When asked how the knowledge can be applied to their learning environment, participants provided 54 responses which were coded into 8 different applications. The most common application involved being able to implement a technology assessment (38.9%). Another common application involved technology integration (11.1%).

When asked what benefits involvement in this workshop have or potentially have for the students that they serve, participants provided 65 responses, resulting in a total of 23 different benefits. The most common response involved the benefits resulting from technology integration (23.1%). Other commonly reported benefits included increases in self-esteem (12.3%) and greater independence when working with technology (10.8%).

When asked how the learning environment can benefit from their involvement in this workshop, participants provided 51 responses resulting in 24 different benefits. The most common responses involved the integration of new knowledge into program activities (23.5%). Other commonly reported benefits included the implementation of technology assessments (15.7%) and the organization of technology assessments (11.8%).

Overall responses on the *Exit Survey* show a diverse range of knowledge gained from each of the nine workshops. Educators indicated many ways that their new knowledge would be applied to their learning environment. They also provided a variety of benefits that they see for their children and for their learning environment resulting from their own knowledge and skill gain after participating in EC-TIIS workshops.

CPDU Evaluation summary. Educators requesting CPDU credit completed an evaluation form developed by the Illinois State Board of Education for each EC-TIIS workshop they completed. Participants were asked to rate their agreement on a five-point scale (*Strongly Agree*, *Somewhat Agree*, *No Opinion*, *Somewhat Disagree*, and *Strongly Disagree*) with five items. The number of educators requesting CPDUs ranged from eight for Software Workshop; nine for Technology Assessment; to 10 each for Adaptations, Computer Environment, and Family; to 11 each for Curriculum Integration, Emergent Literacy, and Expressive Arts. When asked if the workshop increased their knowledge and skills, all participants *Strongly Agreed* or *Somewhat Agreed* for all workshops. On the item related to whether the Standards were clear, at least 90% *Strongly Agreed*. When asked if participant gained experience in the subject matter, at least 90% *Strongly Agreed* or *Somewhat Agreed*. Between 8-10% had *No Opinion* on this item across all of the workshops. This may be due in part to the fact that online format is not a hands-on type of experience.

When asked if the workshop was well organized, all responded with *Strongly Agreed* or *Somewhat Agreed*. Concerning whether participants were able to apply materials learned, 89% agreed for seven of the workshops. For the Curriculum Integration Workshop, 9% *Somewhat Disagreed,* and 10% *Somewhat Disagreed* on this item for the Math, Science, Social Studies Workshop. The online workshop format may have been the reason some participants thought they could not apply what they learned.

A second part of the CPDU Evaluation form contains three open-ended items, asking for comments on the best features of the workshop, suggestions for improvement, and other comments and reactions. Examples of comments on best features for individual workshops include:

- *Workshop was very informative. I liked the concise way information was presented. I have a better understanding of how to make adaptations on the computer.*
- *The best features were the online accessibility and the way the information was presented. Learners could set their own pace and be able to get more information on specific topics.*
- *The management strategies gave me great insight on what I need to do on taking turns at the computer.*
- *The best features were the easily communicated information in organized website format and the attached PDF files that correspond with topics that generated further ideas.*
- *The best feature of this workshop was how I could incorporate the computer activity to all the areas in the classroom. It gave me some great ideas.*
- *This was great information, that I can use in my day-to-day job to help children.*
- *Adaptations for students with disabilities was very useful. The large number of PDFs with integration/application of ideas was wonderful. Site was very accessible - I've bookmarked some of the suggested material sites for future use.*

- *This workshop gave me great insight on being expressive with art. I am not artistic by any means but this gave me hope on using other techniques to help out, like the computer.*
- *New ideas for parent workshops. All the tips to get the parents involved especially the invitations and videos.*
- *I liked everything about this workshop from the links to relating to standards and all the ideas.*

Few suggestions for improvement were offered. Examples include: *I think more Windows XP information should be offered; Use more examples;* and *Take out some surveys.* For this item, the majority of responses were *I see no improvement for this workshop; It was great!; Very informative;* and *Another great workshop.*

Other comments and reactions from CPDU recipients included:

- *Thank you for providing this timely information in such a simple but comprehensive manner.*
- *Great info!*
- *This was just another outstanding workshop. Thanks!*

Case study example. A review of one teacher's responses reveals interesting comments related to her experience with each workshop. This case study is of a Head Start Teacher located in Michigan. The data from the EC-TIIS Surveys indicated that this teacher was interested in learning more about adaptations, emergent literacy, and family involvement. The Head Start Teacher completed eight of the nine workshops (Adaptations, Computer Environment, Curriculum Integration, Emergent Literacy, Expressive Arts, Family, Software, and Math, Science, and Social Studies). She completed the workshops over a span of 62 days, averaging approximately one workshop per week. She earned a *Certificate of Completion* (15 contact hours). Comments from this teacher's *Exit Survey* are shared here as a means of demonstrating the levels of impact related to the ECTIIS workshops.

Impact on teacher. This teacher commented on several benefits that the workshops had on her professional growth. For example, after completing the Adaptations Workshop, she commented on the workshop's ability to help her stay current: *I learned about new equipment available for special needs adaptation. I also learned some new techniques to make more specific goals for my individual children.* She also provided some insight into her change in knowledge after completing the Software Workshop: *I have learned that software can be the basis for many other activities and learning experiences within the classroom. I have learned how to find developmentally appropriate software for preschool children.* An additional example of impact is her statement following the Computer Environment workshop illustrating reflection on her previous practice and beliefs: *I have learned that the setup/placement of my computer area was less than desirable. I have also learned that the children can be more independent in computer use.*

Impact on classroom. Although the *Exit Survey* was completed at the end of the workshop experience, the teacher was already implementing changes to her classroom based on workshop content. One example is the teacher's response related to the Computer Environment Workshop. She stated, *I have rearranged my classroom and changed my computer area providing greater access for the children as well as increased independence in the use of the computer. I had an Easy Ball that broke – this workshop helped me find another type of mouse to use.* The workshops have also impacted her role in the school beyond classroom instruction. After completing the Adaptations Workshop, she commented, *I have already requested that I be allowed to purchase special switches for my cerebral palsy child. My new knowledge is helping me rethink my classroom computer use as well. My special needs children will have greater access to the computer and more ease of use. It will also encourage self-help and independence – two very important goals in my program.* The teacher not only discussed changes that she made while completing the workshops but also discussed changes that she plans to make in the near future. One example of this planning is her comment related to the Curriculum Integration Workshop where she offered the following: *I will find software programs that are related to our current theme and integrate it into our weekly lesson plans. I will also make certain that the special needs children are involved and engaged in this process.*

Impact on children. The ECTIIS workshops are designed to be used by those working with special needs children so they can use what they have learned to enhance the educational experiences of children with special needs. The teacher provides some insight into how her experiences with ECTIIS effects the children she serves. One area of impact was in access to computers. When discussing the Computer Environment Workshop, the teacher commented, *The benefits include independence, team work, shared learning experiences, and an increased knowledge of computers. The majority of my students do not have computers in their homes.* A similar comment was shared in connection with the Curriculum Integration Workshop: *Anything that provides more learning opportunities for my Head Start children is a benefit to them. It will also show them that there are many ways to learn about the world around them.* This teacher also noted changes in the children's role in the class: *I am seeing more children use the computer as well as more group use. The children are aiding each other instead of relying on adult assistance. The new mouse is easy for the preschoolers to use.* Regarding Expressive Arts, she wrote, *I see children becoming and feeling successful. Dance and music will stimulate brain function. Exploration of art medias/play dough will aid in growth and build confidence.* She also anticipates further benefits to the children as she continues to make changes to her instruction: *I see the development of a more complete integration of whatever we happen to be studying at the time. This will broaden their scope of learning. Anything that provides more learning opportunities for my Head Start children is a benefit to them. It will also show them that there are many ways to learn about the world around them.*

Family follow-up data. EC-TIIS staff sent an e-mail containing ten follow-up questions to 32 families who registered on the website. Five families responded. All of the families indicated that their child was still using a computer and that they used software with their child at home. The children most often explored programs, problem solved, and drew pictures while at the computer. Families rated the popularity of the computer for their child as high. Family comments on the benefits of their experience with the online workshops were positive.

Study 3 Follow-up Data

Faculty data. From Fall 2004 through Fall 2007 semesters, 120 faculty from universities and community colleges in 32 states registered on the EC-TIIS website. Twenty (16.7%) were from Early Childhood Education departments, 19 (15.8%) from Education; and 12 (10%) from Special Education. Other responses represented 48 different specialized departments. Most of the faculty (112, 93.3%) indicated that they use the Internet as a resource for their courses, while 96 (80%) have used online workshops as part of their coursework.

Seven faculty members from University of Tennessee, Eastern Michigan University, Western Illinois University, and Lincoln Christian College (Illinois) who participated in EC-TIIS Phase 2 research continued using the EC-TIIS workshops as supplements to coursework in Special Education, Early Childhood, and Instructional Technology and Telecommunications during Phase 3. In the Spring of each year, EC-TIIS staff sent a questionnaire through e-mail 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. In Years 1 and 2, follow-up was conducted with these seven faculty members. 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.*

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 continued using the EC-TIIS workshops with their students when content was applicable to the course. 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.

At the beginning of Year 3, staff sent all registered faculty a letter encouraging them to use EC-TIIS workshops and a handout with tips for integrating workshop content into their courses. Later in the year, a follow-up questionnaire was sent via e-mail to faculty asking if they had used the online workshops or if they planned to use them in the future. Staff received 16 responses, 14 of which were completed questionnaires. Two e-mail messages came from faculty who were no longer teaching. Of the 14 faculty who answered the questions, seven indicated they used the workshops in their courses, while seven said they were not able to use the workshops yet.

Reasons for not using the workshops included time constraints, not having time to re-design their course to include workshop content, and not teaching a course that was applicable to the EC-TIIS content.

The number of workshops used by faculty ranged from one to nine workshops. All used the Adaptations Workshop in their course. Faculty were asked how they integrated the online workshops into their courses. One University of Illinois professor used the workshops in a clinical language disorder course, using the material as background for students to review before selected lectures. She indicated the online workshops were *Very informative and reduced the amount of time spent in lecturing. Students prefer the workshop approach as a required reading. They were able to integrate some of the information immediately into their clinical practice.* A professor at a community college in Florida used EC-TIIS in her early childhood course, "Introduction to Working with Young Children with Special Needs." She said, *I assigned students various workshops and the feedback has been very positive. I included the workshops in each section of the course because they were so valuable.* A professor from School of Educational Studies at a university in Malaysia wrote *I use the ideas and the way the workshop is designed as an example of computer integration for my undergraduate students who specialize in preschool education.*

When asked about benefits for themselves and their students, faculty responses included *This is an excellent website. My students are able to see some examples of computer integration.* Another faculty wrote, *I did not have a component on computer use with disabilities so this added a needed component. The workshop gave students an awareness.* A community college instructor added, *The workshops have given me the opportunity to expose my students to resources outside of our college. The students have enjoyed the workshops and have recommended them to others in the early childhood field.*

When asked if they intended to use the online workshops in the future, all seven faculty who already use the workshops said they would continue using them in the future. Six of the seven who have not used the workshops yet said they plan to use them in the future. One faculty member added, *This course is excellent.* Another commented, *Keep up the good work!*

Student data. Three hundred eighty-two (382) EC-TIIS participants registered as university students over the 3-year period. The majority of students (*n*=150) were from Western Illinois University, followed by 52 from DePaul University, 42 from Eastern Michigan

University, 29 from Blue Ridge Community College, 17 from Lincoln Christian College, 15 from University of Louisville, 12 from Northern Arizona University, and 8 from University of Tennessee. One hundred twenty-two (122) other schools are also listed. When asked what their major was, 115 students indicated Special Education, 89 were in Early Childhood, 38 Education, 26 Special Education and Elementary Education, 18 Early Childhood Special Education, and 24 other specialized fields of study. The largest numbers of students were graduates (125) and juniors (98) at universities.

Faculty using EC-TIIS workshops were asked to distribute a follow-up questionnaire to their students at the end of the semester. Students were asked about benefits they received from participation in the workshops and what effect their participation would have on future teaching. EC-TIIS staff received responses from 62 undergraduates from Early Childhood and Instructional Technology courses and 27 graduates from Early Childhood courses.

When undergraduate students were asked what benefits they gained from the workshops, responses included *I learned many different ways to use technology in the classroom and with children that have special needs*; *The EC-TIIS information was good. Much of this I didn't know about, so it was helpful; They are a great resource to have and are full of information that will help me as a future educator;* and *This opened up my eyes and gave me a great introduction to assistive technology*.

Undergraduate students were asked what effects they thought the workshops would have on their future teaching. Responses included *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 help me when I am deciding on a way to include a child with special needs*; and *I will remember many of the ways to address the curricular areas using technology and/or adaptations*.

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. 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. A few of the 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 parent involvement ideas.

When asked how their participation in the workshops impacted the children in their classroom, all 27 graduate students responded with comments related to children's increased skill development and choice-making, benefits gained from an appropriate environment set-up, increased access to material and increased time on computer. Twelve of the 27 students (44.4%) expressed an interest in continuing to use EC-TIIS workshops in the future.

Two students earned graduate credit from Western Illinois University through IDT 573 for their participation in the online workshops. They submitted a written assignment for each of the nine workshops. Each workshop assignment had an accompanying set of evaluation criteria. Table 23 shows a sample of the required assignment and criteria for the Curriculum Integration Workshop.

Both students worked on their assignments over an 18-month period and earned 3 semester hours of graduate credit. One of the students is a preschool teacher who applied the content to her classroom and curriculum. The other was a speech and language specialist, so most of her work centered around communication activities. Both provided positive feedback on their experience with the online workshops and they plan to continue using EC-TIIS as a resource in the future.

Table 23. Sample IDT 573 Assignment and Evaluation Criteria

Curriculum Integration Workshop

Develop a written plan for integrating technology into the curriculum using the following guidelines. Plan can be written for your classroom or an individual child.

Include the following in the plan:

1. Describe at least three ways technology can benefit young child(ren). (3 points)
2. Describe at least three classroom goals or IEP goals that can be enhanced through technology. (3 points)
3. Develop a technology plan for one selected goal:

Curricular area: (1 point)

Goal: (1 point)

Technology resources: (3 points)

- Describe the adaptive materials (e.g.switch mount, holder),input method (e.g. switch, IntelliKeys), and software.

Curriculum Activities:

- Describe procedures for introducing the technology/software activity to the child(ren): (3 points)
- Describe how the software can be integrated into at least two other curricular areas (eg. art, math, literacy) (8 points)
- Describe adaptations you will provide to insure the child(ren) can participate in both computer and off-computer activities. (4 points)
- Explain the techniques you will use to evaluate whether the child (children) has met the goal. (4 points)

Total points: 30

Objective 4.0: Disseminate Information About EC-TIIS

EC-TIIS staff participated in a variety of dissemination activities, including national, regional, and state conference presentations, exhibits at national and regional conferences, listserv postings, website links, and articles in professional publications. One EC-TIIS target was printing and distributing at least 300 brochures or flyers every 6 months. That target was exceeded. Staff distributed over 2100 copies of EC-TIIS brochures and flyers at conferences and workshops, through requests received via phone, mail, or e-mail and through mailings to Study 1 sites.

National OSEP Conferences

Staff participated in the OSEP Research Project Directors' Conference each of the 3 years, providing EC-TIIS information and data results to conference participants. In July 2005, staff presented data results and website information to 12 participants at a combined breakout session, *Using Technology to Enhance Training*. Staff also presented a poster session that year, resulting in individual discussions about EC-TIIS with 60 participants. In August 2006, staff presented a poster session, *EC-TIIS 3: Effects of Online Workshops on Educators and Families*, during the OSEP conference with 40 participants receiving information on the research and website. In July 2007, staff presented a breakout session, *Integrating Technology and Early Literacy Instructional Strategies for Children, Teachers, and Families*, to 14 participants focusing on EC-TIIS Emergent Literacy Workshop. An Illinois teacher who participated in EC-TIIS online workshops spoke during the session about her experience and the benefits she gained. That same year staff also presented a poster session, *Effects of Online Workshops on Early Childhood Educators and Families and Resulting Child Outcomes*, to 35 participants at the OSEP conference. Participation in the conference resulted in increased registrations and interest in the website by state level administrators.

Other OSEP conference participation included a poster session, *Early Childhood Technology Integrated Instructional System*, presented by staff at the National Center for Technology Innovation Conference in Washington, DC, in November 2004. Staff gave 25 individuals a demonstration of the EC-TIIS website and discussed the online data collection system. In December 2005, EC-TIIS staff presented a poster session and distributed 50 brochures at OSEP's Early Childhood Project Directors' Meeting in Washington DC.

National Early Childhood and Assistive Technology Conferences

EC-TIIS staff participated in several national early childhood and assistive technology conferences including the annual National Association for the Education of Young Children (NAEYC) conference. In November 2004 in Anaheim, California, and again in December 2005 in Washington DC, EC-TIIS 3 Co-Director was a member of the planning committee and helped facilitate the technology room and distribute information on EC-TIIS for the NAEYC Conference. Between her involvement in the tech room and providing conference presentations, the Co-Director distributed 150 EC-TIIS brochures and flyers. In November 2007, staff presented sessions, *Universal Design, Early Literacy, and Technology*, and *Effectiveness of Online Workshops as Early Childhood Training*, providing 30 NAEYC conference participants with information on EC-TIIS website and research. In June 2008, staff presented a session on EC-TIIS research to 12 participants at NAEYC's Professional Development Institute in New Orleans.

Staff presented a session, *Providing Curriculum Access to Young Children: Online Workshops for Educators*, to 15 participants at the Assistive Technology Industry Association (ATIA) Conference in Orlando, Florida, in January 2007 and a session, *Effectiveness of Online Workshops as Early Childhood AT Training*, to 8 participants at the ATIA conference in February 2008.

State and Regional Conferences

In April 2005, staff provided a hands-on technology session to 30 educators at the Midwest Association for the Education of Young Children (AEYC) Conference in Minneapolis. Session participants registered on the website and submitted baseline data. Two staff members demonstrated the website and provided access information to 25 educators from various parts of Illinois during two workshop sessions at STARNET Summer Camp at Western Illinois University in Macomb, Illinois, in August 2005. EC-TIIS staff participated in an exhibit sponsored by the Center for Best Practices in Early Childhood at the Illinois Education and Technology Conference (IETC) in November 2005 and poster sessions at the conference in 2006 and 2007. Staff demonstrated the website and provided information on the online workshops to 150 IETC participants during the three conferences.

Listserv Postings and Website Links

Besides providing information to conference participants, EC-TIIS staff advertised the online workshops on early childhood and assistive technology listservs. On August 23, 2005, information about EC-IIS workshops was posted on *EducatorsOnline Exchange*, an informational network for childcare professionals and families. Within 48 hours of the posting, 131 individuals registered and completed baseline data at the EC-TIIS website. Over 30 e-mails requesting information on credit options were also received in that time. An additional 30 individuals registered within the next 2 days.

EC-TIIS staff posted information on listservs in answer to individual questions. For example, on January 17, 2006, EC-TIIS information was posted on the Technology and Young Children Interest Forum listserv during a discussion on technology topics for teacher education. The posting was sent to 413 listserv subscribers. As a result of the posting, 23 registrations were received within 24 hours. Additional postings, April 4 and April 9, 2007, were made to the listserv to 338 recipients.

On September 12, 2007, EC-TIIS staff posted information about the online workshops on the QIAT (Quality Indicators for Assistive Technology) listserv as an awareness for subscribers. Again in March 2008 staff posted a message to QIAT listserv about EC-TIIS in answer to an individual's question about resources for early childhood. Both postings resulted in increased number of registrations on EC-TIIS website.

Several organizational and training websites include links to EC-TIIS website. Examples include the Child Development Training website <www.childdevelopment.org> which provides training links for childcare providers throughout California. EC-TIIS is listed under online training and Western Illinois University. As reported under Objective 3.0 (page 24), California ranks fifth in number of EC-TIIS participants from an individual state.

EC-TIIS is listed 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>. EC-TIIS staff noted an increase in participation from New York educators and families during the past year. New York ranks sixth in number of EC-TIIS participants.

EC-TIIS website is also linked to NAEYC's Technology and Young Children website under Technology with Children <http://www.techandyoungchildren.org>. EC-TIIS staff belong to the

Technology and Young Children Interest Forum's listserv and provide EC-TIIS information to individuals requesting information on curriculum and online resources or training.

EC-TIIS staff provided information about the workshops to Illinois early childhood educators and families through the state's regional technical assistance project, STARNET, online newsletter and events calendar in January 2007. Staff posted a message about EC-TIIS online workshops in November 2007 and March 2008 to the statewide STARNET listserv. Several STARNET staff members registered at EC-TIIS website and disseminated information about the workshops to educators and families they serve throughout the state.

Online Publications

Numerous professional publications included articles or information about EC-TIIS online workshops. In November 2006, a short article about EC-TIIS was featured on the front page of the *Childcare World.com Newsletter*. This electronic newsletter is distributed to childcare providers and families around the world. The March 2007 edition (Issue 60) of the Family Center on Technology and Disability's *News and Notes* featured an interview with EC-TIIS Co-Director. The online article, *Early Childhood Education & AT: A Tool, Not a Crutch*, included EC-TIIS information and a link to the Center's website. The monthly online newsletter is available and archived at the website, <www.fctd.info>. The Center for Implementing Technology in Education featured EC-TIIS online workshops on the front page of their electronic newsletter, *CITEd NEWS*, for June 20th and July 3, 2007 issues. This online publication is distributed to educators, administrators, and families across the country.

Illinois Division of Early Childhood published a short article about EC-TIIS, *Online Workshops for Early Childhood Educators and Families*, in the Summer 2007 issue (Volume 13, Issue 3) of their online newsletter, *IDEC*. The publication is available to any educator or family member. In Fall 2007, an article by EC-TIIS staff, *Providing Curriculum Access to Young Children: Online Workshops for Educators*, was published in Volume 4, Number 1 issue of *Assistive Technology Outcomes and Benefits*, a joint online publication of the Assistive Technology Industry Association and the Special Education Assistive Technology (SEAT) Center.

In October 2008 an article, *Online Learning Opportunities in AT*, written by EC-TIIS Co-Director appeared in *TAM Connector*, a publication of the Council for Exceptional Children's Technology and Media Division. The current publication is available online to any visitor of the

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

Other Dissemination Activities

In Year 2, EC-TIIS flyers were distributed to 1000 childcare providers by the training coordinator for Riverside County Child Care Consortium in Riverside, California. Staff saw increased registrations. EC-TIIS Co-Director contacted Susan Goode at National Early Childhood Technical Assistance Center (NEC-TAC) about disseminating information about EC-TIIS through *eNotes* sent electronically to national subscribers. Instead of posting through the weekly publication, Goode sent an e-mail notice to her mailing list of state level Part B and C administrators. EC-TIIS staff received requests for information and registrations from many state directors as a result of the dissemination activity. For example, Florida's Part C Early Steps Program Assistant Director sent EC-TIIS information to childcare directors and regional administrators throughout the state. Since most of the awareness information was sent online, EC-TIIS does not know the number of individuals contacted about EC-TIIS throughout the country as a result of NEC-TAC dissemination.

In Year 3, upon request of Georgia's Effingham County Board of Education Assistant Special Education Coordinator, staff sent 75 EC-TIIS brochures for a statewide meeting of early childhood educators. The Director of Montana's Assistive Technology Project requested 50 brochures to distribute throughout the state. UCLA National Arts and Disability Center entered information about EC-TIIS in its database as a resource for its national audience of educators.

Staff impacted 476 individuals directly through conference presentations and workshops and over 2100 through dissemination of brochures and flyers. Many more individuals were impacted by numerous listserv postings, website links, and published articles. Since many of these dissemination activities are through online outlets, the exact number of individuals impacted is not known.

Conclusions About Success of Project and Its Impact

Results of EC-TIIS 3 demonstrate attainment of the study's research goals and the effectiveness of the workshops on the use of technology with young children with disabilities. Research results confirm Phase 2 findings. 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. 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.

Qualitative data from teachers points to the effects of their EC-TIIS participation on the use of technology in their classroom. They 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. Most teachers indicated the website served as a good resource for themselves as well as others in the field.

Early childhood staff 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. 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. Some noted positive changes in children's progress.

Faculty who incorporated EC-TIIS workshops into course content found the information to be beneficial to students, especially as it concerned addressing the needs of children with disabilities. Students indicated the online format was enjoyable, reported many gains in knowledge related to workshop content, and noted their participation would be beneficial to their current or future teaching position. The effectiveness of the workshops for college students points to the fact that different types of educators benefitted from EC-TIIS.

Overall participants indicated the workshop design was of high quality and the content was current and addressed developmentally appropriate practices in early childhood. Educators, faculty, students, and families commented on the usefulness of the workshops as a vehicle for training on early childhood and assistive technology topics.

Lessons in Online Training Learned

EC-TIIS 3 staff learned many lessons related to the development of a sophisticated online data collection system and the implementation of research in an online environment. First, the development and testing of the online system is a time consuming endeavor. EC-TIIS 3 research and data retrieval depended on the operation and maintenance of the complicated data collection system. The resulting system used in EC-TIIS 3 provides a model which can be used by others conducting online training.

Second, to insure that a complete set of workshop pre-assessments were completed, staff programmed the online surveys and assessments so that participants were required to complete all questions before entering any workshops. Before this programming change, many incomplete surveys and few pre-assessments were received. After the change, the user must answer all questions before he/she can access the workshops. This change resulted in complete sets of data for the surveys and pre-assessments.

Third, EC-TIIS staff learned from Phase 2 that an incentive was needed to get educators to complete assessments and provide other data. In Phase 3, EC-TIIS offered four types of professional development credit: Certificate of Completion, Continuing Education Units (CEUs), Continuing Professional Development Units (CPDUs), and graduate course credit. As part of the credit requirements, participants needed to complete the workshop post assessment and *Exit Survey*. This provided both quantitative and qualitative data to support claims of effectiveness. Staff also learned that the use of a discussion board must also be connected to an incentive. Although many EC-TIIS participants had access to the discussion board, only those receiving course credit used this type of technology.

Fourth, EC-TIIS staff learned that one problem in collecting data online is the difficulty in tracking website participants. Each time a follow-up survey was distributed via e-mail to participants, at least 15% of messages were returned indicating invalid e-mail addresses. Also, getting follow-up data, especially child data from participants was difficult. When EC-TIIS staff sent a request for child data to 350 educators, no response was received. The only examples of child data came from the two graduate students using the online workshops for

IDT 573 credit. They included descriptions of child products in their course assignments.

Advice for Educators Interested in EC-TIIS

EC-TIIS online workshops are available to teachers, families, support personnel, faculty, and students through the website. Anyone interested in the project is welcome to register on the EC-TIIS website and review workshop content. Center staff continue to disseminate information about the workshops and encourage educators and families to take advantage of this early childhood resource. Faculty can incorporate the workshops into course content and use EC-TIIS Performance Indicators as part of class assignments. College students can use the workshops as a resource for early childhood and special education courses.

Plans for Continuing EC-TIIS

The need for EC-TIIS online workshops continues. Although data collection for this report ended in January 2008, between February 1, 2008 and December 31, 2008, EC-TIIS received 323 registrations, nine CPDU credit requests, six CEU credit requests, and 13 Certificate of Completion requests. Faculty from universities and community colleges continue to use the online workshops in their courses, impacting current and future educators. Presently, EC-TIIS online workshops continue to be available through the Center for Best Practices in Early Childhood, whose administration is seeking external funding to hire staff to update workshop content, maintain technical assistance to users, and oversee the CEU, Certificate of Completion, and CPDU processes, thereby allowing early childhood educators, families, university faculty, and students continued access to the online workshops that have proven beneficial to some many people.

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