Providing Curriculum Access to Young Children: Online Workshops for Educators

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Abstract: Nine online workshops developed by the Early Childhood Technology Integrated Instructional System (EC-TIIS) at Western Illinois University meet the need for training for educators and families on evidence-based practices related to assistive technology (AT) and young children. Results of a research study conducted by EC-TIIS indicate that the online workshops are effective in increasing knowledge, skills, and attitudes of participants. This paper describes the online data collection system, which includes both quantitative and qualitative measures, and data results. Research groups include early childhood educators, families, university faculty, and students. As a result of their participation in the online workshops, educators indicate changes made in their classrooms to make materials more accessible to children. By incorporating the workshops into course content, faculty provide a valuable resource to their students, who in turn gain information and strategies to guide them as educators in making curriculum accessible to all children.

Key Words: Online workshops, Early childhood, Assistive technology, Preschool technology integration

Despite the ever-increasing development of new technologies and educational strategies, many educators and families still struggle to provide their young children with disabilities access to educational materials and activities. Although research shows that young children with disabilities can benefit in many ways from assistive technology (AT), lack of training on AT is a barrier to its use (Hutinger et al., 1994). Educators may know that assistive technology should be considered for a child as part of the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA, 2004), but being able to implement AT into daily routines and curriculum requires a unique set of skills. Teachers need training on different technologies and strategies to integrate those technologies into the curriculum and impact children's learning (Berard, 2004). Educators who do not use technology to its full extent blame lack of time and lack of awareness of training opportunities (Judge, 2001).

Two groups with national focus recently identified AT implementation training as an important issue in the education field. Results from a recent study on AT use by the National Assistive Technology Research Institute (NATRI) at the University of Kentucky indicate that AT implementation plan use is inconsistent across the ten states surveyed (Bausch, Hasselbring, & Ault, 2006), suggesting lack of training as a possible problem. Experts participating in the 2005 AT Outcomes Summit identified professional preparation as one of the themes and specifically the need for technology implementation training, going beyond computer basics and connecting curriculum and technology (Parette, Peterson-Karlan, Smith, Gray, & Silver-Pacuilla, 2006).

AT Training Needs in Early Childhood

Although technology training opportunities are documented throughout the media, the majority of content addresses K-12 with little or no mention of preschool or AT applications. The Tots n Tech Research Institute (see http://www.asu.edu/clas/tnt), funded through the U.S. Department of Education, conducted a survey of early intervention programs and providers to determine what type of training providers and families were currently receiving. Out of 450 responses, 321 (71.3%), indicated they attended face-to-face trainings, while 150 (33.3%) engaged in "self-study on the Internet," a training category identified on the survey. Despite the fact that training was offered in early childhood, the study revealed that the majority of training materials targeted school-age students rather than infants and toddlers (Sawyer, Milbourne, Dugan, & Campbell, 2005).

In April, 2006, The National Child Care Information Center compiled a listing of training opportunities (i.e., Distance Learning in Early Childhood Education), divided into five categories, correspondence courses, Internet/Web-based courses, interactive media courses, satellite training courses, and television/video courses. The 12 listings for Internet/Web-based courses were courses offered for continuing education credit or university credit. None of the descriptions included AT or technology integration as a topic.

Although there appear to be many online training opportunities for early childhood, the majority are courses offered through community colleges or universities. According to The National Early Childhood Technical Assistance Center (NEC-TAC; 2007), the U.S. Department of Education currently funds only two early childhood projects which address online training in a format other than university coursework connected to personnel preparation grants. NEC-TAC lists 117 projects which meet the descriptor "distance learning/web-based model or components" criteria. However, out of 117 projects, only 40 are currently funded and only 2 of those offer online training to a large audience. Twenty-three of the 40 projects are personnel preparation for a small number of students; six are state implementation grants; seven use other technologies, such as distance education, video conferencing, and use of website for dissemination purposes; one is a regional center for nine states using technology as a networking method; and one is a national center that makes no mention of online or distance education in their project description (National Early Childhood Technical Assistance Center, 2007).

Besides the need for AT training as inservice for educators, there is also a need for preservice undergraduate programs to address AT to access curriculum. After surveying 231 institutions of higher education (IHEs), NATRI reports fewer than 30% of undergraduate and 50% of graduate programs include AT in coursework (Bausch, 2006). Over half of the 131 undergraduate programs reported limited or no access to AT devices as part of their program. An AT Outcomes Summit in 2005 also stated concern over the lack of preparation of preservice students to implement technology when they enter the classroom (Parette et al., 2006). When necessary training and support in assistive technology is lacking, the result is an increasing number of children not having opportunities to access the curriculum and meet their full potential.

Online Training Opportunities

Although many online training opportunities are geared toward college credit, educators and an increasing number of families are taking advantage of the versatility and benefits

that other types of online training offer. The main advantages are the convenience of access from any location and at any time and the self-paced mode for learning. Individuals have constant access to outside links and experts around the world. Links provide the most up to date information on equipment and materials (Butler, 2003; Mariani, 2001; Minotti & Giguere, 2003). Online workshops provide a way for educators and families to get initial information on AT and return at a later time for updated information.

An increasing number of early childhood educators are using online training as a mode for professional development (Donohue, Fox, & Torrence, 2007). Childcare providers in California can access a variety of training options from the Child Development website (www.childdevelopment.org) which maintains lists of workshops including online options for professional development credits from organizations across the country. Another informational venue for early childhood educators is online newsletters produced by organizations, such as Childcare World (2006) and the Family Center on Technology and Disability (2007)). Early childhood organizations, such as the National Association for the Education of Young Children's Technology and Young Children Interest Forum (www.techandyoungchildren.org) post information about online training options on their listserv, as do other national and regional education groups.

The use of online training for families and educators is supported by the Council for Exceptional Children's Division for Early Childhood (DEC) as one of its recommended practices concerning technology applications (Sandall, Hemmeter, Smith, & McLean, 2005). DEC recommends that families and professionals use technology to access information and support. Although many websites provide information on early childhood topics, few address evidence-based practices in the use of AT with young children with disabilities.

EC-TIIS Website

To answer the need for evidence-based AT training and to address the current trend in online opportunities, the Early Childhood Technology Integrated Instructional System (EC-TIIS), in the Center for Best Practices in Early Childhood (the Center) at Western Illinois University (WIU) developed nine online workshops for educators and families of young children. Since 2000 EC-TIIS has received funding as a Steppingstones of Technology Innovation for Students with Disabilities Project through the U.S. Department of Education, Office of Special Education Programs (Hutinger, Robinson, & Schneider, 2004). EC-TIIS staff developed the website during Phase 1 (product development) funding and tested it with selected groups during Phase 2 (research with small groups; Hutinger, Robinson, Schneider, Daytner, & Bond, 2006). The Project, which began Phase 3 (research with large groups) in 2004 and is currently one of only two federally funded early childhood projects focusing on online workshops for a broad audience, is researching the effects of using the online workshops on educators and families and the results for young children with disabilities.

EC-TIIS' nine online workshops address the integration of AT into early childhood curriculum. Workshop topics include *Adaptations, Curriculum Integration, Computer Environment, Expressive Arts, Emergent Literacy, Math, Science, and Social Studies, Technology Assessment, Software Evaluation, and Family Participation*. Figure 1 contains a brief description of the workshops.

Figure 1. EC-TIIS workshop descriptions.

Adaptation

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 to design and adapt 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 to integrate 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 to incorporate 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 team process procedures to assess a young child's technology needs and techniques to make equipment, software, and activity recommendations.

Evidence-Based Content

EC-TIIS curricula content is evidence-based, demonstrated to be effective in assisting young children in development of early skills through the Center's demonstration, outreach, and research projects and other studies in the field. Technologies serve a variety of purposes and function as educational tools for young children. Research demonstrates that young children with a wide range of disabilities can use technology, and many of them use it easily and effectively and retain elements of software use over time (Hutinger, Bell,

Figure 2. EC-TIIS Website Homepage

About Us
Contact Info
FAQ
Glossary
Login
Products
Register
Resources
Sample
Workshops

Credit Now Available - see FAQ page

In order to better serve you, this site has been updated. If you registered before June 27, 2005, you will need to re-register (re-register) before you can access the site. You will also need to complete the preliminary surveys. We apologize for the inconvenience.

The Early Childhood Technology Integrated Instructional System (EC-TIIS) is a free online training program for families and early childhood professionals.

Consisting of nine high quality workshops, the project is sponsored by the Center for Best Practices in Early Childhood Education at Western Illinois University.

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Johanson, & McGruder, 2002; Hutinger, Betz, Johanson, & Clark, 2003; Hutinger & Clark, 2000; Hutinger, Johanson, & Rippey, 2000). AT equalizes learning opportunities for children with mild to severe disabilities. Research and practical experience indicate that young children who have experiences with technologies can participate more fully in the regular curriculum and are less likely to be left behind than those without such access (Hutinger, Johanson, & Stoneburner, 1996; Lewis, 2000; Lewis, Ashton, Haapa, Kieley, & Fielden, 1998/1999).

Technology not only provides a way for children to *do things differently* (i.e., communicate, draw, write), but also enables them to *do different things* (e.g., make and use individualized multimedia software or establish a web site; Bell, Clark, & Johanson, 1998; Hutinger & Clark, 2000; Hutinger, Clark, & Johanson, 2001; Hutinger et al., 2001). Children's participation range from simple experiences (touching a key or switch) with immediate consequences to more complex experiences with interactive multimedia activities.

Using technology, educators and families can document learning and enhance activities for young children. Digital cameras, video cameras, scanners, and the Internet can be used to collect images for use in tool software. Children and adults together can develop individualized stories and activities, using authoring software that incorporates

drawings, videotape, sound, animation, and text (Bell, Clark, & Johanson, 1998; Hutinger, et al., 2001; Robinson, 2003). If these many benefits of technology are to be realized by young children, training for early childhood staff and families is needed. Without adults' appropriate knowledge and skills to integrate technology into early childhood curricular experiences, children's potential will remain unmet. EC-TIIS nine workshops meet the training needs of educators and families.

EC-TIIS Format

The workshop website (www.wiu.edu/ectiis/) includes text, graphics, slideshows, links to outside resources, and a variety of downloadable files containing articles and curriculum activities. The workshops meet accessibility guidelines and are available free of charge to any educator or family member of young children for the duration of the project's funding. The homepage (Figure 2) contains a sidebar of choices including Sample Workshops. To view the full workshops, participants must first register at the website. Registration consists of (a) completing a Registration Form (i.e., *Technology Survey*) and one other survey--either the Classroom, Family, Faculty, or Student Survey; and (b) the Pre Assessments for all nine workshops.

Since 2005 professional development credit has been available for workshop participation. Participants may earn a Certificate of Completion, Continuing Education Units (CEUs) from Western Illinois University, Continuing Professional Development Units (CPDUs) from Illinois State Board of Education, or graduate credit from WIU's Instructional Design and Technology Department.

Website Content

Each workshop opens to a page containing links to subtopics. The three workshops focusing on curriculum--*Emergent Literacy, Expressive Arts, and Math, Science,* and *Social Studies*-- have sections on environment, technology integration strategies, adaptations, and assessment.

At the end of each workshop there is a list of Performance Indicators that can be used for group discussions, activities during an inservice, or as assignments for undergraduate or graduate students. Instructors may choose to assign one or two of the Indicators to students as part of their class credit. Faculty can supplement their course content with EC-TIIS workshops and use the Performance Indicators to test students' knowledge on topics.

Another feature on the EC-TIIS website is the Discussion Board. Participants are randomly assigned to 'access' or 'no access' to the Board immediately following the registration process. All university faculty and students have access to the Discussion Board so it can be used in courses if desired. Faculty can request EC-TIIS staff to create a special forum for their students to discuss issues related to course content. Any participants with access to the Discussion Board can use existing forums and post new topics in any of them.

Data Collection

EC-TIIS staff obtain initial data from workshop participants through online surveys and pre assessments completed during the registration process. The Registration Form provides user information such as name, address, e-mail, how the user found the site, his or her current position, and what workshops are of interest to the individual.

All participants are required to complete the *Technology Survey* consisting of questions related to participant's experience with the Internet and other computer applications, such as

creating word processing documents, downloading digital pictures from a camera, sending e-mail attachments, and installing or removing applications. All educators who serve children in a classroom setting complete the *Classroom Technology Survey*, a 27-item questionnaire. Questions focus on the teacher's access to and use of different technologies, such as printer, scanner, and digital camera, along with adaptive equipment, including switch, IntelliKeys®, touch screen, and adaptive mouse devices. The second part of the survey relates to children's use of technology in the classroom. Questions include what technologies the children use, time children spend at the computer, how the computer is used, and what children do while they are using software. Teachers are also asked how they integrate technology into their curriculum.

Families complete the *Family Survey* during the registration process. The survey consists of 10 items including what technologies the child uses outside of the classroom, whether the family member uses software at home with the child, how much time the child spends on the computer outside of school, what the child does at the computer, and whether the family has participated in a technology assessment. A post version of the *Classroom Survey* and *Family Survey* is completed by participants at the end of the study.

Faculty and students are asked initially to complete a brief survey with questions related to their use of the Internet and discussion boards in coursework. EC-TIIS staff obtain information on how the workshops are used by faculty during an end-of-the-year interview. University students complete a short questionnaire at the end of the semester in which they used the workshops.

Data on workshop effectiveness is obtained through an analysis of the *Workshop Pre-Assessment* and *Post Assessment*. Educators and university students are required to complete a pre-assessment for each of the workshops before their initial entry into any of the workshops. The *Workshop Pre-Assessment* has 8-10 items related to knowledge, skills, and attitudes toward the workshop topic. Participants are asked to complete the online *Workshop Post Assessment* after finishing a workshop. A Progress Page listing the workshops and the user's completion of *Post Assessments* is created for each participant and is accessible when the user logs into the website. Users are asked to complete an online *Workshop Evaluation* upon completion of all workshops.

Participants requesting credit provide additional data to the project. All are required to complete an *Exit Survey* for each workshop. The survey consists of five questions regarding (a) workshop completed; (b) skills and knowledge acquired; (c) how those will be applied to the learning environment; (d) benefits seen for children; and (e) how their program, home, or learning environment will benefit from their workshop participation. In addition, those earning CPDUs must evaluate each workshop by rating their gain of knowledge and skills, the relevance of the workshops to teaching standards, and the organization of the content. They also indicate the workshop's best features and provide suggestions for improvement.

All data received online is formatted for direct retrieval to the *Statistical Package for Social Sciences* (SPSS). Analysis is then conducted according to the nature of the data. For each of the Workshop Assessments, all items were compared from pre to posttest using paired sample t-tests. Effect sizes were calculated for all comparisons. Confidence intervals were then determined for each effect size (Coe, 2005).

Results and Discussion

The following discussion of EC-TIIS results is based on Phase 2 data collected and analyzed between October, 2002, and May, 2005 (Hutinger et al., 2006).

Participant Profile

During Phase 2, 415 individuals from 33 states and 15 countries registered on EC-TIIS website. The largest percentage of participants (53.7%) were located in Illinois (*n*=223). Michigan (*n*=26) and California (*n*=25) had the next highest percent of participants, 6.3% and 6%, respectively. Thirty other states were represented, each having fewer than 5% of the total participants.

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

Table 1 presents positions held by the 415 registrants.

Technology Background

The majority of participants had access to a computer and Internet from home. Details on location of access can be found in Table 2.

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 3 contains a summary of participants' responses.

Participants were asked, prior to accessing EC-TIIS workshops, if they needed more technology training. Of the 415 responses, 272 (65%) said 'yes,' 36 (9%) said 'no,' and 107 (26%) did not respond. The type of technology training that participants needed most was curriculum integration at 52% (*n*=216), followed by adaptations 41% (*n*=171), emergent literacy 36% (*n*=151), family participation 36% (*n*=150), software 36% (*n*=148), technology assessment 30% (*n*=124), math science and social studies 29%

Table 1
Positions Held by Workshop Registrants (*n*=415)

Position	*n*	%
University Student	203	50
Early Childhood Educator	70	17
Early Childhood Special Educator	23	6
Pre-K teacher	20	5
University Faculty	20	5
Administrator	19	4
Head Start Teacher	10	2
Family Member	8	2
Support Personnel	5	.5
Program Assistant	3	.5
Other	34	8

Table 2
EC-TIIS Participants' Computer and Internet Access

Location	Computer Access		Internet Access	
	n	%	*n*	%
Home	271	65	363	63
University	183	44	191	46
Classroom	137	33	134	32
Library	117	28	121	29
Work	100	24	96	23
No Answer	101	24	129	31
Other	11	3	13	3

(*n*=122), expressive arts 28% (*n*=118) and computer environment 23% (*n*=94).

Effectiveness of EC-TIIS Workshops

An analysis of pre and post workshop assessment data from Phase 2 shows a significant increase in educators' knowledge, skills, and attitudes in each of the nine workshops (Hutinger et al., 2006). Teachers implemented technology strategies and made materials more accessible for children as a result of EC-TIIS participation. Since participants are not required to review all workshops or complete all post assessments, unless they are requesting professional development credit, the number of participants completing assessments varied with workshops.

The findings across workshops consistently showed gains in self-reported knowledge, attitudes, and skills. Analysis of data from three workshops follows.

Computer Environment Workshop. Ninety participants completed both the pre and post assessments for the *Computer Environment Workshop*. Statistical significance was found for all seven items. Effect sizes ranged from .31 to 4.97. The item with the smallest effect size related to evaluating a computer center. Participants reported high efficacy for this skill as demonstrated by a mean of 4.03 at pre.

Table 3
EC-TIIS Participants' Computer Skills

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

The item with the largest gain was the knowledge item related to setting up technology for independent access by children. Participants reported a mean of only 1.22 at pre (see Table 4).

Curriculum integration workshop. A total of 47 participants completed the pre and post assessments for the *Curriculum Integration Workshop*. Statistical significance was found for all six items. Effect sizes ranged from .51 to 1.45. The smallest effect size was for the attitude item related to incorporating technology into the early childhood curriculum. The largest effect size was found for the knowledge item related to using technology in the preschool classroom (see Table 5).

Technology assessment workshop. A total of 40 participants completed the pre and post assessments for the *Technology Assessment Workshop*. Statistical significance was obtained for all nine items as shown in Table 6. Effect sizes ranged from .81 to 2.01. The smallest effect size was for the attitude item related to the benefits of a technology assessment for children with disabilities. The largest effect size was for the knowledge item related to the information that needs to be gathered prior to a technology assessment.

Table 4
Computer Environment Workshop Assessment Results

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

*p<.05
**p<.01
***p<.001

Table 5
Curriculum Integration Workshop Assessment Results

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

*p<.001

Results from the other six workshops show statistical significance on the majority of items.

EC-TIIS Use in Coursework

Faculty data. Seven faculty members from University of Tennessee, Eastern Michigan University, Western Illinois University, and Lincoln Christian College (Illinois) used the EC-TIIS workshops as supplements to coursework in Special Education, Early Childhood, and Instructional Technology and Telecommunications during the 2003-2004 and 2004-2005 school years. EC-TIIS staff sent an e-mail questionnaire at the end of each year asking faculty three questions related to benefits of using EC-TIIS workshops, plans for incorporating the workshops into coursework, and suggestions for other faculty about using the workshops. Six out of the seven faculty responded directly to the questions. The seventh faculty member just started to use the workshops in her course and made participation optional for the students. She sent an e-mail with the following comments as feedback: "A few of my students use the workshops. They were very pleased with them. They felt that the workshops were informative and that they learned useful information."

When asked what benefits faculty members saw for themselves and their students when using EC-TIIS workshops, all six indicated that their students gained increased

knowledge on technology and AT. Three thought the links were beneficial to students and that the website served as a good resource for them and their students.

Student data. Although 203 university students registered at the EC-TIIS website during Phase 2, feedback on a follow-up questionnaire was received from 37 Early Childhood undergraduates, 25 Instructional Technology and Telecommunications undergraduates, and 27 Early Childhood graduates. None of the Special Education undergraduates responded to the questionnaire.

When undergraduate students were asked what benefits they gained from the workshops, responses included (a) "The workshops gave me a lot of useful information on how technology can be integrated into the curriculum"; (b) "Overall, the workshop helped me see the possibilities for many activities and assessment strategies I could use in the classroom"; and (c) "The one resource that was really useful was finding the different adaptive input devices that can be

Table 6
Technology Assessment Workshop Assessment Results

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

*p<.001

used to help children use technology."

Undergraduate students were also asked what effects they thought the workshops would have on their future teaching. Responses included (a) "I will remember many of the ways to address the curricular areas using technology and/or adaptations"; (b) It will give me ideas such as how to set up a computer environment and how to integrate literacy in a positive way in the classroom"; and (c) "If I have a child with special needs in my classroom, I will be able to refer to these workshops to adapt the curriculum to him/her."

Graduate students were also asked to comment on benefits they gained from the workshops. Although some felt the information was basic for teachers, they commented on the usefulness of new information on technology applications. 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 graduate students noted using specific strategies from the workshops, such as using the computer sign-up for emergent literacy, putting more options on the computer for the expressive arts, and trying the parent involvement ideas.

Graduate students were also asked how their participation in the workshops impacted the children in their classroom. All 27 students responded to this question with comments related to children's increased skill development and choice-making, benefits gained from an appropriate environment set-up, and increased access to materials and increased time on computer.

Outcomes and Benefits

The EC-TIIS nine online workshops provide much-needed training in early childhood and AT for families and educators. As a result of participation in EC-TIIS, users are more knowledgeable and skilled in using technologies in the early childhood environments. Participants gained new knowledge in areas related to technology and curriculum integration, and made specific gains in emergent literacy and expressive arts knowledge. Follow-up data indicate that educators made changes to the classroom as a result of knowledge gained in the workshops. They made equipment more accessible to children, designed the computer environment more appropriately, and integrated specific strategies at the computer, such as use of a sign-up sheet.

Early childhood staff who used the online workshops observed many benefits for children resulting from 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 also described children as more excited and interested in learning; and more creative and interactive when learning. They reported child gains in many skills, including communication, social, problem solving, and cooperative play. Children are more interested in art as a result of changes made in the art center after their family or teacher participated in the .

Expressive Arts Workshop

Children have more opportunities to gain independence and self-esteem as a result of materials and activities being more accessible. 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.

Through participation in EC-TIIS, faculty have access to AT content to incorporate into early childhood or special education courses. As a result, university students have information and strategies to guide them as educators in making curriculum accessible to all children in their classroom.

Summary

EC-TIIS provides evidence-based AT training in an accessible online format for early childhood educators and families. When incorporated into university coursework, the online workshops also meet the AT preparation needs of preservice students. Data collected through the project's online system provides evidence on the effectiveness of web-based training as a tool for educators and families in advancing educational opportunities of young children with disabilities.

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