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Assistive Technology User Groups and Early Childhood Educators

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Abstract

This article explores the potential of User Groups as a professional development venue for early childhood educators in developing operational and functional competence in using hardware and software components of an Assistive Technology (AT) Toolkit. User Groups are composed of varying numbers of participants having an interest in technology, and are led by one or more skilled facilitators who meet with participants across time to help them acquire and demonstrate new technology skill sets. A series of these groups were conducted with seven early education professionals serving young preschool children who were at risk or who had disabilities. The impact of these User Groups was examined using self-reports subsequent to User Group participation. Specific data were collected regarding the types of technologies that had been used, and the types of classroom instructional products that had been created and implemented in classrooms using the technologies. A discussion of the value of User Groups is presented.

As a result of both trends in best practice (Parette, Blum, Boeckmann, & Watts, 2008; Parette, Hourcade, Denelli, & Boeckmann, 2009) and federal mandate (Individuals with Disabilities Education Improvement Act of 2004 [IDEIA 2004]), early childhood education professionals increasingly are being encouraged to use assistive technology (AT) with young children who are at risk or who have disabilities. AT is a potentially powerful adjunct in facilitating a child's active engagement with both the physical environment and his/her social environment (Kling, Campbell, & Wilcox, 2010). As such, AT offers the potential for young children to more effectively explore, learn, and play, allowing previously unavailable learning opportunities to emerge. Unfortunately, while the implementation of AT is required to be considered when developing individualized education plans (IEPs), U.S. government data report ongoing underutilization of AT with young children (e.g., U. S. Department of Education, 2000, 2001, 2002).

For education professionals to use AT effectively with young children with disabilities in classroom settings, those teachers must first (a) develop a basic *understanding* of technology and its potential contributions to education, (b) demonstrate some proficiency in *using* AT to create classroom instructional supports, and then (c) actually *create and implement* instructional activities and products using the technology. In doing this practitioners must acquire both *operational competence* (i.e., familiarity with the basic features of a particular technology) (Light, 1989), and *functional competence* (i.e., the ability to use the particular technology to create specific classroom products) (Parette & Stoner, 2008).

Historically, knowledge and skills related to AT have not received extensive coverage in early childhood teacher preparation (Judge, 2006; Judge & Parette, 1998). Indeed, early childhood educators often report a near-complete lack of preservice training in the use of AT (e.g., Bausch & Hasselbring, 2004). For many teachers, such skills typically are acquired only *after* these individuals have begun begin working with young children in classroom settings.

The need for high quality, coordinated, and targeted AT professional development for early childhood educators has long been recognized (Bowman, Donovan, & Burns, 2001; Chen & Chang, 2006; Darling-Hammond, Chung, & Frelow, 2002; Helterbran & Finnemore, 2004; Lesar, 1998). Since so many potentially powerful technologies are available to early childhood education professionals, the need to develop operational and functional competence in using these tools is becoming ever more important. One particularly promising approach to enhance technology skills is to provide ongoing professional development activities for early childhood educators after an initial training experience has been provided (Fullan, 2002). These follow-up sessions offer invaluable opportunities to develop and refine AT skills (Joyce & Showers, 2002),

Professional Development through User Groups

Unfortunately, such commonly provided short-term professional development activities as teacher workshops may not produce significant and sustained change among classroom practitioners (Gibbons, Kimmel, & O'Shea, 1997). Recently, a promising alternative structure for developing lasting AT skill sets among education professionals has emerged in the form of *User Groups* (Parette, Peterson-Karlan, Wojcik, Watts, et al., 2007; Parette & Stoner, 2008; Parette, Stoner, & Watts, 2009). An AT User Group is defined as a group of education professionals who (a) have a shared interest in AT, (b) are committed to developing new skill sets about an array of AT devices and implementation in the learning community, (c) are supported for their participation in the user group setting, and (d) share their learning with other education professionals in the community (Parette, Peterson-Karlan, Wojcik, Watts, et al., p. 30). User Group sessions generally are led by one or more skilled AT practitioners, and are conducted across multiple dates. These ongoing sessions allow participants to (a) develop and practice new AT skills, (b) ask questions relevant to the use of AT applications specific to their students and curriculum, and (c) share their learning and products with others.

User Groups provide participants with the opportunity to develop and refine AT skills and to share new ideas in the context of a learning community. Participants in User Groups usually collaborate with one another both during and outside of the formal User Group sessions. (More detailed discussions of the design and benefits of User Groups may be found in Parette, Peterson-Karlan, Wojcik, Watts, et al.; Parette, Stoner, & Watts, 2009). The success of User Groups in developing and maintaining technology skills in teachers has been reported in several research projects (e.g., National Center for Technology Innovation, 2006; Parette, Watts, & Stoner, 2005-2008).

However, to date relatively little is known about the impact of these User Groups on the subsequent professional use of AT by participants *after* this professional development has been completed. That is, after concluding a planned series of User Groups sessions targeting AT, what do the participants then go on to *do* with the technology? If the goal of AT professional development is to increase the implementation of AT in classroom settings (Zabala & Carl, 2005), it is imperative that specific education professional outcomes be documented.

This project sought to better understand how User Groups impact operational and functional skills in AT in early childhood teachers, with specific emphasis on examining the degree to which participation in an AT User Group results in early childhood professionals developing and implementing AT products in their work. We were especially interested in learning which types of technology were being used most often, and for what purposes.

Method

Participants

The participants in this study were seven early childhood educators who worked in a self-contained preschool building in a moderate sized public school district in the midwest. Three teachers taught in classrooms serving at-risk children identified as at risk, while the remaining four taught in special needs classrooms. Five teachers had bachelor's degrees while two held master's degrees. All teachers held state teaching certificates.

This preschool program was participating in the *Making A Difference Using Assistive Technology* (MDAT) project (Parette, Watts et al., 2005-2008) funded by the Illinois Children's Healthcare Foundation. The purpose of this three-year grant was to examine the impact of AT on emergent literacy skills among children who were at risk or who had disabilities. All seven participating teachers reported having had no prior experience in using technology in their respective classrooms.

Assistive Technology Toolkits

As part of the MDAT project, each of the classrooms at the preschool was provided with an AT toolkit (Edyburn, 2000; Lahm & Case, 2003; National Center for Technology Innovation and Center for Implementing Technology in Education, 2006; Puckett, 2004). The hardware and software components of the AT Toolkit were selected primarily on the basis of their perceived potential use in creating classroom instructional products.

Hardware provided in each of these AT Toolkits included a (a) Dell™ personal computer and keyboard, (b) microphone, (c) scanner, and (d) digital camera. Software in each AT Toolkit included (a) the Intellitools® suite (Intellitools®, 2006); (b) *Boardmaker™ with Speaking Dynamically Pro®* (Mayer-Johnson, 2006); and (c) *Writing with Symbols 2000* (Widget Software Ltd., 2007). Each of these components in the AT Toolkit was selected based on an examination of the literature and teacher classroom 'best practices' applications, and for its potential utility in helping develop emergent literacy skills with young children.

Teachers additionally had access to the Microsoft® Office Suite (Microsoft®, 2008), including *PowerPoint™*, which was provided by the school district and installed on each of the Dell computers. Each participant also was provided with a (a) Bluetooth® keyboard, (b) wireless mouse, (c) ceiling-mounted liquid crystal display (LCD) projection system, and (d) wall-mounted screen

User Group Professional Development

Each of the seven participants participated in a series of User Groups designed to help him or her use the toolkit contents. Four Illinois State University faculty members who taught AT coursework conducted the User Groups. One faculty member served as primary leader of the group sessions, while the other faculty members served to provide one-on-one support in trouble-shooting operational use of different features of particular technology tools, and assist in participants' development of instructional materials.

Four User Group sessions were conducted over the summer, with another four sessions offered the following fall. The teachers were provided with stipends of $250 if they attended six out of the eight two-hour sessions. All seven participants attended at least six of the eight sessions.

Best practice in planning for effective User Groups includes assuring that each session is flexible enough to afford participants an opportunity to articulate their learning needs and interests, and to have those addressed (Parette, Peterson-Karlan, Wojcik, Watts, et al., 2007). To this end, each User Group session had a different set of professional emphases designed to respond to the unique needs and preferences of its specific participants. To accomplish this, the first of the eight User Group sessions opened with a scaffolded dialogue that included completing a goal sheet from participants regarding their classroom needs, preferences, and the specific types of knowledge and skills they hoped to acquire about the AT Toolkit and its classroom applications.

This preliminary needs assessment for subsequent sessions was followed by a preview of the targeted training that would be provided to the group in that initial session. To further support learning in the User Group session(s), for each session the session leaders prepared for participants a CD that contained information relevant to that session, and provided these CDs to participants prior to each session. These CDs included (a) listings of relevant Web resources; (b) basic and supplemental information provided via such formats as Microsoft® *PowerPoint™* files, .PDF files, and multimedia productions; and (c) other supports as relevant to that session's focus. Each User Group session focused on direct training in the use of each of the AT Toolkit hardware and software components to develop familiarity with and functional competence in using the tools, with special emphasis on the creation of emergent literacy products for classroom applications.

Use Survey

Six months after the last User Group session was conducted, all seven teachers were asked to complete an online survey form targeting their use of the AT Toolkit since the date of the initial User Group session. The questions developed for the survey form were designed to (a) determine the degree to which teachers were *using the technologies* that had been provided to them in their AT Toolkits, (b) identify the *types of classroom activities* in which the AT Toolkit technologies were being used, and (c) ascertain the teachers' *perceptions of ease of use* of the AT Toolkit technologies. The survey form used check boxes and drop down menus to facilitate ease of response. Minimal inputting of text information was required.

More specifically, we examined respondents' reported usages of the following hardware and software components that were included in the AT Toolkits.

- microphone
- scanner
- digital camera
- *Intellitools® Classroom Suite*
- *Boardmaker™*
- *Speaking Dynamically Pro®*
- *Writing with Symbols 2000*
- *PowerPoint™* (not provided in the AT Toolkit, but present on every participant's computer)

These components were targeted in the survey because each potentially can be used to generate classroom activities and/or instructional products. In addition, we identified five primary types of educational activities and products commonly generated by teachers, and sought to learn from the respondents which technologies had been used to develop which of these types of products.

- Instructional Presentations (teacher-developed instructional activities)
- Visual Schedules (a series of pictures that communicate steps or sequences in an activity)
- *Intellitools®* Activities (a multimedia authoring technology to develop instructional activities)
- Choice-Making Activities (classroom products or activities created which afford children an opportunity to make choices and establish autonomy and self-direction)
- Additional Classroom Activities (any other instructional support materials that teachers used in their classroom programming for individual or group activities)

The potential contributions of each of the components of the AT Toolkit in generating each of these five types of outcomes had been covered extensively in the User Group sessions.

In the survey, respondents were asked to identify for each of these five educational activities the specific types of AT Toolkit technologies used to create the activities (e.g., 'What tools did you use to create the Instructional Presentations? Check ALL that apply.)

- *PowerPoint™*
- *Writing with Symbols*
- *Boardmaker™*
- *Intellitools® Classroom Suite*
- *Speaking Dynamically Pro®'*
- Digital camera
- Scanner
- Microphone

We also sought to identify respondents' perceptions regarding how *easy* each of the AT Toolkit technologies was to use. This was done through a question on the survey in which teachers were asked to rate each of the AT Toolkit hardware and software components on a five point Likert-type scale ranging from '1' (very easy to use) to '5' (very difficult to use).

Finally, we sought to learn more about the frequency and nature of use of the ceiling-mounted liquid crystal display (LCD) projection systems that were included in each AT Toolkit. Participants were to respond to two questions on this: (a) "How often do you use the projector?" ('1-3 times daily;' 'daily;' 'once a week;' 'once a month'); and (b) "For what purpose(s) do you use the projector?" ('story telling,' 'teaching concepts,' 'game,' 'specific literacy activity,' 'other').

Results

Frequency and Types of Use of the AT Toolkit Technologies

The respondents reported that many of the hardware and software components included in the AT Toolkit were widely used in a variety of classroom activities (see Table 1). For example, all seven teachers reported that they had used Microsoft® *PowerPoint*™ for developing instructional presentations, with another two respondents noting that they also used *PowerPoint*™ for additional classroom materials. *Writing with Symbols 2000* also enjoyed generalized use throughout a variety of educational activities. Teachers reported using this software in developing instructional presentations, visual schedules, *Intellitools*® activities, and choice-making activities. *Boardmaker*™ also experienced generalized use, reported by several teachers as contributing to the development of instructional presentations, visual schedules, choice-making activities, and additional classroom activities.

The digital camera was also used frequently. Teachers reported using the camera in developing instructional presentations, visual schedules, choice-making activities, and additional classroom activities.

Other AT Toolkit technology components were used less often. *Speaking Dynamically Pro*® was reported to have been used in an instructional presentation, in a visual schedule, in a choice-making activity, and in an additional classroom activity. However, each of these implementations was reported only once. The microphone was used by three teachers in developing instructional presentations, while the scanner was reported by one teacher as having been used. The *Intellitools*® *Classroom Suite* was reported by three respondents to have been used in doing *Intellitools* activities, with no other usage noted.

Ease of Use of the Components of the AT Toolkit

The results of the 'Ease of Use' portions of the survey are displayed in Table 2. In general, the digital camera, Microsoft® *PowerPoint*™ and *Writing with Symbols 2000* were reported as the easiest to use by the seven respondents. All seven teachers evaluated these three tools as 'Very Easy' or 'Easy.' *Boardmaker*™ was also seen as 'Very Easy' or 'Easy" by six of the seven.

Frequency and Types of Use of the LCD Projector

Large screen projection technologies, such as Smartboards (Smart™ Technologies, 2008) and LCD projection systems have been reportedly to be effective in teaching various literacy skills to children (cf. Blum, Watts, & Parette, 2008; Mechling, Gast, & Krupa, 2007; Mechling, Gast, & Thompson, 2008). Since teachers participating in this study were provided with an LCD projection system and screen, we were curious about the frequency and types of use of these large screen technologies.

Four teachers reported using the ceiling mounted projector daily, while the remaining three noted usage one to three times a week. Regarding purposes of LCD use, all seven teachers reported using it for 'teaching concepts,' six teachers reported use for 'specific literacy activities,' five noted use for 'games,' and two noted use for 'other activities' (i.e., "to review photos and movies of field trips and special activities" and "to display student photos").

Discussion

Too often the outcomes of professional development activities for teachers are not assessed in any substantive way, impairing greater understanding of how such experiences impact subsequent professional practice. Given continuing calls for outcomes-based AT service delivery nationally (e.g., Parette, Peterson-Karlan, Smith, Gray, & Silver-Pacuilla, 2006), more productive evaluations of the effectiveness of professional development structures, including User Groups, is vital.

Professional development activities designed to develop greater instructional competencies in teachers must address a fundamental question: "Does this professional development activity make a *difference*?" More specifically, does the professional development advance the knowledge and skills of the participants? If so, in what ways? Once the specific types and amounts of new knowledge and skills the teachers have acquired as the result of a professional development activity are documented, schools can then move on to ascertain the degree to which these teacher changes impact student learning.

This study provides support for User Groups as a professional development venue for early childhood practitioners in developing specific technology knowledge and skills as implemented in early childhood classroom settings, as participants reported their professional behavioral repertoires were significantly expanded with the inclusion of a variety of newly acquired technology-based competencies. These User Group participants reported that they frequently used several of the AT Toolkit components. This outcome is especially significant in that the participants all began this process reporting no prior experience in using technology in their classrooms. We concluded that the seven teachers' participation in the User Group sessions facilitated their subsequent implementation of a variety of technologies in a diverse set of classroom and instructional implementations.

Previous reports have noted that User Groups contain unique structural features that can contribute to growth in the knowledge and skills of teachers (e.g., Parette & Stoner, 2008). Specifically, User Groups (a) provide time to practice newly developed skills; (b) facilitate collaboration among professionals who ultimately become a 'learning community;' (c) enable individualization of professional development experiences for participants; and (d) allow for on-site support in natural educational settings (i.e., the classrooms where instruction occurs). Such benefits have been reported to contribute to successful teacher professional development in (a) providing technology supports for struggling school-age writers (Peterson-Karlan, Wojcik, & Parette, 2006); and (b) the use of Microsoft® *PowerPoint*™, LCD systems, and implementing direct instruction to teach emergent literacy skills in preschool settings (Blum et al., 2008).

Understanding the impact that professional development activities targeting technology may have on subsequent teacher practice is especially important given that extensive use of technology to support student learning is still not widely practiced in early childhood education (Loveless & Dore, 2002; Siraj-Blatchford & Whitebread, 2003). Research regarding the impact of technology-oriented professional development, particularly for teachers of young children who are at risk or have disabilities, remains limited (Campbell, Milbourne, Dugan, & Wilcox, 2006; Mistrett, Lane, & Ruffino, 2005).

In this study, Microsoft® *PowerPoint™*, *Writing with Symbols 2000*, *Boardmaker*, and the digital camera were reported to be the most frequently used AT Toolkit components (see Table 1), while the *Intellitools® Classroom Suite*, *Speaking Dynamically Pro®*, microphone, and scanner were less frequently used for creating instructional supports. As Judge (2006) observed, Microsoft® *PowerPoint™*, *Writing with Symbols 2000*, and *Boardmaker* have proven to be to be particularly useful in early childhood settings.

Given its utility as well as its widespread availability, it is not surprising that all seven teachers reported that they used Microsoft® *PowerPoint*™ for developing instructional presentations, with another two respondents noting that they also used *PowerPoint*™ for additional classroom materials. *PowerPoint*™ is noted as a 'readily available' technology for use in early childhood classroom settings (Blum & Watts, 2008; Parette, Hourcade, Boeckmann, et al., 2010; Parette, Hourcade, Dinelli, et al., 2009), with an extensive array of established classroom applications (Roblyer, 2006).

Both Microsoft® *PowerPoint™* (Blum et al., 2008; Parette, Blum, et al., in press; Parette, Hourcade, et al., in press) and the use of digital cameras in classroom settings (Roblyer, 2006; Schiller & Tillert, 2004) have received extensive support in the early childhood literature. Partly as a result, the use of each of these AT Toolkit components was covered extensively early on in the progression of User Groups. As a result, the teachers had repeated opportunities to use and develop comfort with these tools.

It may be that as the teachers developed knowledge and skills regarding use of a particular technology (e.g., Microsoft® *PowerPoint™*), they came to prefer to continue practicing with this new technology across subsequent User Group sessions and in their classrooms. If so, it is possible that this preference may have inadvertently inhibited their subsequent receptiveness to the introduction of new technology skill sets (i.e., *Intellitools® Classroom*

Suite and *Speaking Dynamically Pro*®), as these technology novices may have felt they were already learning as much as they could. This may be especially true if the teachers saw the immediate applicability of the AT Toolkit components covered early in the User Group sessions in creating common and useful classroom instructional supports, such as visual schedules.

In contrast to such software as *PowerPoint*™, the *Intellitools*® *Classroom Suite* and *Speaking Dynamically Pro*® software are *authoring packages*, requiring considerably more intensive professional development for knowledge and skills to be acquired and used effectively in classroom settings. In the eight provided User Group training sessions, these two software programs were not introduced until the latter sessions. As a result, teachers did not have as much opportunity for developing knowledge and skills regarding their use.

Similarly, specific targeting of the use of the microphone and the scanner in developing instructional content and activities for the classroom was not extensively covered in the User Groups sessions. Rather, coverage of this hardware typically occurred in the context of other topics (e.g., developing Choice-making activities, *PowerPoint*™ presentations, or Visual Schedules). When specific interest in these applications was expressed, participants were provided with one-on-one training.

It is certainly possible that greater and more explicit coverage of these technologies in the User Group sessions would have resulted in more extensive implementation of them in the classrooms. Absent specific focus on the use of any technology tool contained in the teachers' Toolkits, many technology novices such as those in the present study may conclude that these tools are simply too difficult to learn to use, with the effort not worth the possible but yet unknown benefits. In the absence of targeted professional development (as exemplified by these User Group sessions), simply providing teachers with these tools is unlikely to result in their being implemented in classrooms.

It seems reasonable to speculate that those educational technologies that would be used most frequently by teachers are those that are both (a) effective in generating successful educational products and (b) relatively easy to use. In this study, the technologies reported by most respondents as easy to use (the digital camera, Microsoft® *PowerPoint*™ and *Writing with Symbols 2000*) were also reported to be used most frequently. Such a pragmatic finding concerning the perceived "user friendliness" of technology for teachers has potentially significant implications for software and hardware developers targeting this market.

The small group of teachers in this study potentially limits generalization of the findings to other groups of early childhood education professionals. In addition, we did not differentiate between younger versus older teachers. Age differences have been identified as significant predictors of technology preferences and use patterns (Oblinger & Oblinger, 2005; Peterson-Karlan & Parette, 2008). It would be interesting in future investigations to identify potential age-technology use relationships in early childhood educators. In addition, potential concerns with User Groups do exist. These include (a) frustration with varying skill levels of participants, and (b) logistics of accessing all the materials needed to create a particular instructional product (e.g., materials being at school that were not accessible in the User Group setting, and vice versa).

Nevertheless, this study provides initial support for the potential of User Groups as a particularly promising form of professional development to help early childhood educators in implementing several technology applications in their classrooms. Subsequent investigations might examine other hardware or software technologies as components in alternative AT Toolkits.

A variety of technologies has become inextricably integrated into the professional lives of most professionals. Early childhood educators are no exception. It is critical that these teachers develop functional and operational competencies with an array of technologies to better support the learning of young children (Mistreet et al., 2005). Once teacher core competencies with specific technology applications have been well-established and documented, emphasis should be shifted to examining the impact of technologies on children's learning.

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Table 1
Use of Tools Reported By Teachers By User Group Activities (n = 7)

Tools Used	Instructional Presentations	Visual Schedules	Intellitools Activities	Choice-Making Activities	Additional Classroom Activities
	n Mentions (%)				
PowerPoint™	7 (100)	0 (0)	0 (0)	0 (0)	1 (14.3)
Writing with Symbols 2000	2 (28.6)	3 (42.8)	1 (14.3)	1 (14.3)	6 (85.7)
Boardmaker™	5 (71.4)	6 (85.7)	0 (0)	3 (42.8)	5 (71.4)
Digital Camera	4 (57.1)	4 (57.1)	0 (0)	4 (57.1)	6 (85.7)
Scanner	1 (14.3)	0 (0)	0 (0)	0 (0)	0 (0)
Microphone	3 (42.9)	0 (0)	0 (0)	0 (0)	0 (0)
Intellitools® Classroom Suite	0 (0)	0 (0)	1 (14.3)	0 (0)	0 (0)
Speaking Dynamically Pro®	1 (14.3)	1 (14.3)	0 (0)	1 (14.3)	1 (14.3)
*Intellitools Activity Exchange**	--	--	3 (42.8)	--	--

* Item included in only one survey question

Table 2
Ease of Tool Use Reported by Teachers in Developing Classroom Activities (n = 7)

	Responses											
	Very Easy		Easy		Neutral		Difficult		Very Difficult		Not Applicable	
Tools	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Digital Camera	5	71.4	2	28.6	0	0	0	0	0	0	0	0
Microsoft® PowerPoint™	2	28.6	3	42.9	0	0	2	28.6	0	0	0	0
Writing with Symbols 2000	3	42.9	4	57.1	0	0	0	0	0	0	0	0
Boardmaker™	2	28.6	4	57.1	1	14.3	0	0	0	0	0	0
Scanner	2	28.6	1	14.3	3	42.9	0	0	0	0	1	14.3
Microphone	1	14.3	1	14.3	4	57.1	0	0	0	0	1	14.3
Intellitools® Classroom suite	1	14.3	1	14.3	2	28.6	1	14.3	2	28.6	0	0
Speaking Dynamically Pro™	1	14.3	1	14.3	1	14.3	0	0	0	0	4	57.1