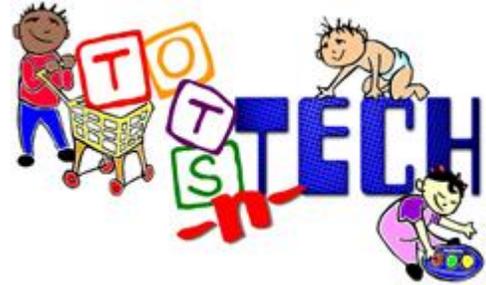


Evidence-Based Strategies for Training Adults to Use Assistive Technology and Adaptations



Carl J. Dunst, Ph.D.
Carol M. Trivette, Ph.D.

Orelena Hawks Puckett Institute
Ashville and Morganton, NC

Abstract: This research brief summarizes findings from a research synthesis of the effectiveness of different types of practices for promoting practitioner and parent adoption of different kinds of assistive technology and adaptations for young children with disabilities. The research synthesis included 35 studies of 839 adult participants and 1100 child participants. The assistive technology that were the focus of training included speech generative devices (e.g., CheapTalk), computers (e.g., adapted keyboards), and switch activated devices and toys. Six operationally defined adult learning method characteristics and between 2 and 5 practices for each characteristic were used to code and analyze the studies in terms of both adult (practitioner and parent) and child outcomes. Results showed that particular practices for each adult learning method characteristic proved most effect in terms of changes and improvements in both the adult and child outcomes. A key characteristic of the most effective training practices was active learner participation in all aspects of the training. Results also showed that when combinations of the most effective practices were used as part of the training, the more positive were the adult and child outcomes. A checklist based on the research synthesis results is included for developing and

implementing evidence-based training methods and procedures.

Introduction

Assistive technology and adaptations have been found effective for influencing child participation in everyday activities which in turn provide the children participation-based learning opportunities for behavior and skill development (Campbell & Sawyer, 2007; Mistrett et al., 2001; Ostensjo, Carlberg, & Vollestad, 2003; Trivette, Dunst, Hamby, & O'Herin, 2010); yet assistive technology and adaptations have been routinely found to be underutilized with young children with disabilities and especially infants and toddlers (see Campbell, Milbourne, & Wilcox, 2008). Campbell, Wilcox, and their colleagues have extensively investigated the reasons why this is the case. They have found, among other things, that the training opportunities afforded practitioners and parents influence their beliefs about and attitudes toward assistive technology and adaptations (Dugan, Campbell, & Wilcox, 2006; Sawyer, Milbourne, Dugan, & Campbell, 2005; Weintraub Moore & Wilcox, 2006). Close inspection of the types of training provided practitioners and parents suggests that the training they were provided may not have been optimally effective because the training did not include practices that are likely to promote sustained use of assistive technology or adaptations. The extent to which different types of training, as well as specific types of training practices, were associated with the use of assistive technology and adaptations as well as child behavior and functioning was the

focus of a recently completed research synthesis (Dunst, Trivette, Meter, & Hamby, 2011).

This research brief includes a summary of the results from a research synthesis of studies of young children with disabilities where different types of assistive technology and adaptations were used to promote child participation in typically occurring activities to affect the behavioral competence of the children (Dunst et al., 2011). The assistive technology included “devices ranging from simple (e.g., adapted spoons and switches to [those that were more] complex (e.g., computers, augmentative communication systems, environmental control devices, electric wheelchairs” (Wilcox, Guimond, Campbell, & Moore, 2006, p. 33). The different types of assistive technology taken together included devices that made it possible for young children with disabilities to increase, maintain or improve the functional capabilities of the children. The adaptations included both environmental accommodations and modifications to activities and materials (e.g., Bailey & Wolery, 1992; Campbell et al., 2008; Doctoroff, 2001; Mayfield, 1996; McCormick & Feeney, 1995; Sandall, 2003) that make it easier for young children with disabilities to participate in natural settings and everyday learning opportunities (Campbell et al., 2008).

This research brief summarizes results on the effects of different types of training for promoting practitioner and parent adoption of assistive technology or adaptations with young children with disabilities. The brief highlights which kinds of practices were related to positive adult and child outcomes in studies providing training either or both practitioners or parents to use assistive technology or adaptations. The interested reader is referred to Dunst et al. (2011) for the findings pertaining to the effects of the training on child outcomes.

Method

Studies

Thirty-five studies were located that included 839 parents and practitioners who received training in the use of assistive technology or adaptations. There were 1,100 child participants in the studies ranging from 5 to 96 months years of age. The majority of the children had identified disabilities, including, but not limited to cerebral palsy, Autism, Down syndrome, speech and language impairments, and multiple disabilities. The studies were examined to determine in what manner different types of training influenced both the adoption and use of assistive technology or adaptations by parents and practitioners which in turn influenced child outcomes.

Procedure

Six adult learning method characteristics were used to code and analyze the studies (Dunst & Trivette, in press; Trivette, Dunst, Hamby, & O'Herin, 2009). The six characteristics are listed in Table 1. The three main features were planning, application, and deep understanding. Each feature included two characteristics. Planning included the methods and procedures for (1) *introducing* new knowledge, material, or practices to learners and (2) *illustrating* and *demonstrating* the use of the knowledge, material, or practices by instructors or trainers. Application included the methods and procedures for (1) learner *applied use* of knowledge, material, or practices and (2) learner *evaluation* of the outcome or consequence of application. Deep understanding included the methods and procedures for (1) engaging the learner in *reflection* on his or her learning experience and (2) learner self-assessment of *mastery* as a foundation for identifying new learning opportunities. The particular types of practices used for each of the six characteristics were also coded to identify those features of the training that were associated with the most positive benefits.

Results

The findings from the research synthesis showed that most of the practices for each of the six adult learning method characteristics were related to both the adult and child outcomes, but that particular practices for each of the six adult learning methods characteristics were more strongly related to the study outcomes. Table 2 lists the particular practices found most effective for promoting adoption and use of assistive technology or adaptations. These practices included the following:

- Trainer descriptions and explanations of the assistive technology or adaptations proved most effective for *introducing* the assistive technology or adaptations to the practitioners and parents.
- Incorporating the trainees' experiences and knowledge in the training, trainer demonstrations, and trainer role playing were found most effective for *illustrating* or *demonstrating* the use of the devices or adaptations to the participants.
- The *practices* that were most effective for promoting the participants' abilities to use the assistive technology and adaptations were real-life application, role playing, and trainer-guided participant practice.
- Trainer feedback and trainer-requested feedback by the participants were most effective in terms of having the participants *evaluate* the consequences of their experiences using the assistive technology or adaptations.
- Group discussions and trainee journaling about their experiences using the assistive technology or adaptations were most effective for having trainees *reflect* on their knowledge and skills.
- Opportunities for learners to generalize their use of the assistive technology or the use of a standards-based self-assessment scale or checklist to judge their knowledge and skills using the assistive technology or

adaptations were most effective for *assessing trainer mastery*.

In addition, using a *combination* of the above practices as part of training dramatically increased the effectiveness of the training on both adult and child outcomes. The training was especially effective when 4 or 5 of the practices for each adult learning characteristic were incorporated into the training afforded the practitioners and parents.

A key characteristic of the training that was related to optimal benefits for learners was the active participation of the trainees in experiencing the six adult learning method practices. The more actively involved learners were in each component of the training, the greater the benefits were for the learner.

Several other features of the training also proved important. Training sessions that had a smaller number of participants tended to be associated with the most positive practitioner and parent outcomes. Training was also more effective when it was conducted in settings that provided adult participants situated, real-life opportunities for learning to use the assistive technology or adaptations (e.g., having the adults learn to use the device that was specific to the child or children with whom they would work).

Implications for Practice

The implications of the results from the research synthesis for training practitioners and parents to adopt and use assistive technology and adaptations are straightforward. The findings highlight the particular practices and the conditions under which attempts to promote adoption and sustained use of assistive technology or adaptations are likely to be most effective. This includes (a) active trainee involvement in all phases of the learning process (planning, application, deep understanding), (b) the use of practices that are appropriate for particular contexts and situations (e.g., learner-informed

input, real-life application, trainer-guided practice and feedback, standards-based self-assessment of mastery), (c) training a small number of practitioners or parents in a concentrated manner, and (d) having children use the assistive technology or the adaptations during the adult learning process. The more the training involves trainer and trainee opportunities to interact, reflect on, discuss, and assess progress towards mastery, the more likely the training will be effective.

Performance Checklist

The findings described in this research brief, together with findings reported in Dunst et al., (2011) and Trivette et al. (2009), were used to develop the checklist shown in Table 3 for guiding the development and implementation of effective training practices to promote adoption and use of assistive technology or adaptations. The checklist includes, for each of the six adult learning method characteristics, two of the practices that were related to changes and improvements in practitioner and parent outcomes. Each of the characteristics includes a trainer-focused practice, a trainee-focused experience, and several practices that involve trainer-trainee joint engagement in activities to promote practitioner or parent increased understanding and mastery of the assistive technology or adaptations they are being taught to use.

In addition to the evidence-based practices on the checklist, several other considerations should be incorporated into a training if it is likely to be effective. The training should be done with a small number of trainees and, to the extent possible, the training should be done *in vivo* with the children who will use the assistive technology or adaptations. These additional considerations are likely to have value-added effects.

References

- Bailey, D. B., Jr., & Wolery, M. (1992). Designing and arranging environments

for infants and preschoolers with disabilities. In *Teaching infants and toddlers with disabilities* (2nd ed., pp. 197-227).

Upper Saddle River, NJ: Merrill.

Campbell, P. H., Milbourne, S., & Wilcox, M. (2008). Adaptation interventions to promote participation in natural settings. *Infants and Young Children, 21*(2), 94-106.

Campbell, P. H., & Sawyer, L. B. (2007). Supporting learning opportunities in natural settings through participation-based services. *Journal of Early Intervention, 29*, 287-305.

Doctoroff, S. (2001). Adapting the physical environment of all young children for play. *Early Childhood Education Journal, 29*, 105-109.

Dugan, L., Campbell, P. H., & Wilcox, M. J. (2006). Making decisions about assistive technology with infants and toddlers. *Topics in Early Childhood Special Education, 26*, 25-32.

Dunst, C. J., & Trivette, C. M. (in press). Meta-analysis of implementation practice research. In B. Kelly & D. F. Perkins (Eds.), *Handbook of implementation science for psychology and education*. Cambridge, England: Cambridge University Press.

Dunst, C. J., Trivette, C. M., Meter, D., & Hamby, D. W. (2011). Influences of contrasting types of training on practitioners' and parents' use of assistive technology and adaptations with infants, toddlers and preschoolers with disabilities. *Practical Evaluation Reports, 3*(1). Available at http://practicalevaluation.org/reports/CE_Report_Vol3No1.pdf.

Mayfield, P. K. (1996). Adaptations for young children with visual impairments in regular settings. *Early Childhood Education Journal, 23*, 231-233.

McCormick, L., & Feeny, S. (1995). Modifying and expanding activities for children with disabilities. *Young Children, 50*(4), 10-17.

- Mistrett, S. G., Hale, M. M., Diamond, C. M., Ruedel, K. L. A., Gruner, A., Sunshine, C., Berman, K., Saunders, J., & McInerney, M. (2001, February). *Synthesis on the use of assistive technology with infants and toddlers (birth through two)*. Washington, DC: U.S. Department of Education, Office of Special Education Programs. Retrieved January 4, 2008, from http://www.fctd.info/webboard/files/AIR_EI-AT_Report_2001.pdf.
- Ostensjo, S., Carlberg, E. B., & Vollestad, N. K. (2003). Everyday functioning in young children with cerebral palsy: Functional skills, caregiver assistance, and modifications of the environment. *Developmental Medicine and Child Neurology*, 45, 603-612.
- Sandall, S. R. (2003). Play modifications for children with disabilities. *Young Children*, 58(3), 54-55.
- Sawyer, B., Milbourne, S., Dugan, L., & Campbell, P. (2005). Report of assistive technology training for providers and families of children in early intervention. *Research Brief (Tots n Tech Research Institute)*, 2(1). Retrieved January 4, 2008, from <http://asu.edu/clas/tnt/appendix/ATtrainingbrief2-8-05.pdf>.
- Trivette, C. M., Dunst, C. J., Hamby, D. W., & O'Herin, C. E. (2009). Characteristics and consequences of adult learning methods and strategies. *Research Brief (Tots n Tech Research Institute)*, 3(1). Retrieved October 11, 2010, from http://tnt.asu.edu/files/AdultLearning_rev7-04-09.pdf.
- Trivette, C. M., Dunst, C. J., Hamby, D. W., & O'Herin, C. E. (2010). Effects of different types of adaptations on the behavior of young children with disabilities. *Research Brief (Tots n Tech Research Institute)*, 4(1), 1-26. Retrieved September 8, 2010, from http://tnt.asu.edu/files/Adaptations_Brief_final.pdf.
- Weintraub Moore, H., & Wilcox, M. (2006). AT and young children: Confidence, experience, and education of early intervention providers. *Topics in Early Childhood Special Education*, 26, 15-24.
- Wilcox, M. J., Guimond, A., Campbell, P. H., & Moore, H. W. (2006). Provider perspectives on the use of assistive technology for infants and toddlers with disabilities. *Topics in Early Childhood Special Education*, 26, 33-49.

Appendix A

Characteristics of the Adult Learning Methods Used to Code the Training Methods

Features/Characteristics	Definition
<i>Planning</i>	
Introduce	Engage the learner in a preview of the material, knowledge or practice that is the focus of instruction or training
Illustrate	Demonstrate or illustrate the use or applicability of the material, knowledge or practice for the learner
<i>Application</i>	
Practice	Engage the learner in the use of the material, knowledge or practice
Evaluate	Engage the learner in a process of evaluating the consequence or outcome of the application of the material, knowledge or practice
<i>Deep Understanding</i>	
Reflection	Engage the learner in self-assessment of his or her acquisition of knowledge and skills as a basis for identifying “next steps” in the learning process
Mastery	Engage the learner in a process of assessing his or her experience in the context of some conceptual or practical model or framework, or some external set of standards or criteria

Appendix B

Practices Found Most Effective for Promoting Adoption and Use of Assistive Technology or Adaptations (AT/A)

Characteristics	Practices
<i>Introduction</i>	Participant needs-assessment of their knowledge of the AT/A Trainer description/presentation/lecture on the AT/A
<i>Illustration</i>	Participant input/experience used to explain or describe the AT/A Role playing/simulation using the AT/A Real life demonstration/real life demonstration and role playing using the AT/A
<i>Practicing</i>	Trainer-guided participant practice using the AT/A Real life-use of and/or role playing with the AT/A
<i>Evaluation</i>	Trainer feedback to participants in response to using the AT/A Trainee requested feedback from trainer
<i>Reflection</i>	Participant journaling about the experiences with the AT/A Participant group discussion of the understanding and abilities using the AT/A
<i>Mastery</i>	Participant standards-based self-assessment of knowledge and skills Participant ability to generalize the use of the AT/A

Appendix C

Checklist for Promoting the Adoption and Use of Assistive Technology or Adaptations

Trainer _____ Type of Device/Adaptation _____			
	The training to promote adoption and use of the assistive technology or adaptations (AT/A) included each of the following practices:	Yes	No
Introduction	1. Solicit trainee identification or description of what they expect to learn from the training		
	2. Provide a detailed description or explanation of the AT/A		
Illustration	3. Use trainee knowledge or experience with the AT/A or similar devices to provide example(s) of application		
	4. Demonstrate the use of the AT/A either <i>in vivo</i> or through role playing		
Practicing	5. Engage the trainee in the use of the AT/A either <i>in vivo</i> or through role playing		
	6. Provide the trainee trainer-guided practice using the AT/A		
Evaluation	7. Engage the trainee in evaluation of his/her experience using the AT/A		
	8. Provide the trainee feedback based on trainer observation of trainee application		
Reflection	9. Engage the trainee in self-assessment of his/her understanding of both the use and consequences of the AT/A		
	10. Together with the trainee, assess trainee performance and identify next steps in the learning process		
Mastery	11. Have the trainee use a checklist or set of performance standards to assess his/her overall mastery of the AT/A		
	12. Provide the trainee opportunities to use the AT/A in different settings or with different children		

TPA Questions and Answers from Local Early Steps

Items highlighted in are pending

The following were published in the 12/1/11 Weekly Memo	
Question	Answer
<p>We left the TPA Security Webinar on 9/28/11 very concerned with the direction that ESSO and Med3000 is taking with our access to data. Their significant restrictions specific to LES Managers/Supervisor being limited to “view only” on the Program Management facet and not being able to access more than one facet will not work and must be revised.</p>	<p>As a matter of fact, within Early Steps we have had at least one instance of using the data system to fraudulently bill services, but that is not why MED3000's TPA system will have strong internal controls. In any business enterprise that involves the exchange of funds, strong internal controls are the best protection against fraud and are required to be in place and audited under OMB Circular A-133. One of the most important aspects of internal controls is separation of duties. This means having more than one person required to complete a task and having an appropriate level of checks and balances upon the activities of individuals. MED3000 will be audited annually for internal controls and their Security Role assignments are key to having an appropriate system in place to ensure one person could not; create a client, authorize services, bill for services, approve the payment of the bill for services, and end up getting paid. Under the TPA contract, MED3000 is financially liable for any discovered instances of fraud within the TPA system, so they have a great deal at stake if internal controls in the system are not upheld.</p>
<p>I wanted to follow-up with you regarding your explanation that the reason for the extremely restrictive security roles is due to fraud. Has there been fraud in the Early Steps system?</p>	<p>Trust and professionalism are not components of internal control. I have personally testified in court on a fraud case where trusting the employee was the reason they were able to embezzle funds. The employee was the daughter of the director's best friend. The director watched this girl grow up and trusted her integrity and professionalism 100%. The employee had access to all financial transactions of the entity, did the bank deposits and reconciled the bank accounts. Thousands of dollars were siphoned out of the organization before she was caught by a 2nd employee who was asked to do a bank deposit when the trusted employee was out sick. The director was mortified that her trust was violated, but learned the lesson the hard way, of the need for separation of duties. We will work with you to figure out your Security Roles to ensure your program activities are not compromised.</p>
<p>I am writing to share my concerns with the TPA roles. At NE LES most managers are cross trained for at least a couple of roles to ensure coverage. Many admin staff have split responsibilities due to decreased funding. I like being able to do whatever is needed (intake, authorizations, data entry, verification, etc.) This will greatly limit our ability to support staff in their roles. We will need to completely reorganize the internal structure of our local program which will not be easy without more money. For example, we have one person primarily doing provider enrollment and that is usually all that is needed. If she is out, I cover until she returns. Since I will not be able to do it, I will need to have one more person with that role and no other that can provide back-up coverage. I have similar concerns for intake and billing. It would be nice for at least the managers to have full access as applicable to their work unit(s). Is there any way this could be considered? Please let me know if you have any questions.</p>	<p>Additionally, there will be extensive training available before and during the TPA implementation where you and your staff will be able to see how your work will change. Please bear with us, the end result will be a more efficient and effective system. We will discuss Security Roles more on the Director's and Coordinator's call.</p>
<p>Is the PM going to be able to bill insurance? Have you heard anything new about that?</p>	<p>We think so, they are working on determining this for sure.</p>

Question	Answer
Are you going to have this in our contract that we have to use the PM?	Yes
Once the IFSP is built in the system and we are up and running, how much authority does ESSO have to update and change the IFSP if the need should arise in the future?	I believe that they are aware that as we move down the road that changes will be needed and they will be amenable as long as it isn't out of the scope of the project
you tell me if providers will be expected to purchase software for electronic billing to Med3000?	No, they will submit invoices by, fax, mail and possibly web portal . Submitting electronically via web-portal will result in faster payment.
Will paper claims (CMS 1500) be accepted?	Yes
How will supporting documentation be sent, i.e. eobs, consult forms, travel forms	Faxed, mailed and scanned
What is the process of recouping Part C funds when a child becomes retroactively eligible with Medicaid?	Med3000 has a process associated with refunds. The Local Early Steps Office would update the child's record to reflect that the child's Primary Coverage is Medicaid. A refund is then requested from the provider, and if not received within 45 days the automatic recovery process will begin.
Who determines the budget for Direct Service Expenses that will be held in an account for the TPA to access for the LES?	The LES will develop their line item budget each year for the total amount from the funding allocation methodology, just as you do now. The amount budgeted for Community Direct Services will be withheld in an account for the TPA to access to pay providers.
Will Direct Service Staff funds be held at the TPA or LES level?	Direct Service Staff budget funds would remain in the contract and be part of the 1/12 payment that you bill monthly. Direct services of internal staff that are billable to Medicaid will be billed to Medicaid via the TPA in Practice Management. There is a possibility that the TPA will also be set up to bill private insurance for internal staff, but the final decision on that is pending.
How do we close a child in the TPA once they exit out of Early Steps?	A termination date and closure code field will be in the demographic on the IFSP in the TPA.
Once we close a child in the TPA can that information be followed through to the G page and close services dates?	Yes, this functionality will be in the TPA.
Can we insure that the B form of the IFSP have all the required information that would be need for the Practice Management system to be able to bill for services. Similar to the way the G page will give authorization for the TPA to make payments. This would be useful so that we do not have possible duplicate data entry.	You will not need to reenter any information
"The TPA will bill services provided by Local Early Steps Staff to Medicaid and some private health insurance carriers." Does this include TCM? Is the insurance billing just for ES services/evaluations and not for external community providers?	The TPA will definitely bill Medicaid for all LES staff services, including TCM. Private insurance is a probably, but we haven't gotten confirmation on that. The TPA will not bill any community provider services to third parties.
There are community providers that work across different LESs. What system will be in place to ensure that those CMS ES approved providers that are working in one LES would <u>not</u> be able to services and bill in the TPA for kids registered at another LES where they have not been approved to work for.	Providers working in LES areas with different roll-out dates will have to know which LES is using the TPA when. If they make a mistake and bill, there will be no record of the child being an Early Steps child and no service authorizations so the claim would be denied.