Thomas Jefferson University
Jefferson Digital Commons

Department of Occupational Therapy Faculty Papers

Department of Occupational Therapy

4-1-2008

Adaptation interventions to promote participation in natural settings

Philippa H. Campbell, Ph.D
Department of Occupational Therapy, philippa.campbell@jefferson.edu

Suzanne Milbourne, M.S
Department of Occupational Therapy

M. Jeanne Wilcox, Ph.D.
Arizona State University

Let us know how access to this document benefits you

Follow this and additional works at: http://jdc.jefferson.edu/otfp

Part of the Occupational Therapy Commons

Recommended Citation
Campbell, Ph.D, Philippa H.; Milbourne, M.S, Suzanne; and Wilcox, Ph.D., M. Jeanne, "Adaptation interventions to promote participation in natural settings" (2008). *Department of Occupational Therapy Faculty Papers.* Paper 9.
http://jdc.jefferson.edu/otfp/9

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's Center for Teaching and Learning (CTL). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Occupational Therapy Faculty Papers by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.

As submitted to: *Infants and Young Children* and later published as:

"Adaptation interventions to promote participation in natural settings in Infants and Young Children"

in

Infants and Young Children
Volume 21, Issue 2, April 2008, Pages 94-106
DOI: 10.1097/01.IYC.0000314481.16464.75

Running Head: Adaptation and Assistive Technology Interventions

Adaptation Interventions to Promote Participation in Natural Settings

Philippa H. Campbell, Ph.D
and
Suzanne Milbourne, M.S

Child and Family Studies Research Programs
Thomas Jefferson University
Philadelphia, PA

and

M. Jeanne Wilcox, Ph.D.
Department of Speech and Hearing Science
Infant Child Research Program
Arizona State University
Tempe, AZ

Author Note

Correspondence should be addressed to Philippa Campbell at Thomas Jefferson University, 130 South 9th Street, Suite 526, Philadelphia, Pennsylvania 19107-5233, 215-503-2554 (phone), 215-503-1640 (fax), philippa.campbell@jefferson.edu.

Abstract

Children's participation in everyday activities and routines in home and community settings is an important focus of services for infants and young children with disabilities. Data indicate that assistive technology (AT) is not widely used nor do EI service providers report using AT devices with infant-toddlers. Adaptation interventions combine environmental accommodations and AT in ways that promote children's participation in activities and routines and, also, provide skill-building learning opportunities. A decision-making process for planning and documenting adaptation interventions is outlined with examples of written formats that service providers can use to create successful interventions for infants and young children.

Adaptation Interventions to Promote Participation in Natural Settings

The use of AT services and devices with infants and toddlers in early intervention (EI) programs appeared to be increasing from 1992-1996 (Technical Assistance Project, 2000), however, more recent reports indicate a stable pattern of underutilization (Campbell & Wilcox, 2004). National reports of the percent of infant-toddlers with AT listed as a service/device on their Individual Family Service Plans (IFSP's) have averaged about 4% in each year since 1999 (U.S. Department of Education, 2002). Further, an analysis of the 2820 service records for infants and toddlers participating in the National Early Intervention Longitudinal Study (NEILS; Hebbeler, 2003) reported that AT was listed on 4% of these service records.

A number of explanations for low rates of utilization have been suggested including parent unwillingness to accept device use with their children, provider biases to work on typical skill development, inability to finance devices, lack of consensus about what comprises AT , and limited emphasis on or training about AT in state EI programs. Further, it has been suggested that state policies such as uniform Individual Family Service Plan's (IFSP's) that do not require documentation of AT devices may under-represent actual AT utilization by not providing mechanisms for reporting actual use (Lesar, 1998). However, in a national survey of 967 early intervention providers, 44% reported that either none or few of the children they served who needed AT were in fact receiving AT services or devices (Wilcox, Guimond, Campbell, & Moore, 2005).

The TotsnTech (TnT) Research Institute on Assistive Technology for Infants and Toddlers has conducted a number of studies to explore utilization of AT with infants and toddlers (Campbell & Wilcox, 2004). In an analysis of data from two national surveys, over

90% of 424 EI providers reported positive perspectives about providing AT for infants and toddlers (Dugan, Campbell, & Wilcox, 2005). These same providers were interviewed to explore decision-making about what types of AT would be considered in which developmental situations and at what time points within the infant-toddler age range. The questions focused on decisions about mobility, communication, self-care, and play abilities. Each question was structured so that respondents selected an option from a series that were representative of several intervention categories (e.g., low tech, high tech, skill building, not a concern at this time). These options were repeated within each of three age level categories of under 12 months, 12 to 24 months, and over 24 months. In order to contrast the perspectives of early intervention service providers with those of providers serving children with the most severe disabilities, 37 coordinators of State Deaf-Blind Programs completed a written questionnaire using the same series of questions. For the most part, Deaf Blind coordinators reported use of both low or high technology interventions at younger ages than did the EI providers. Although EI providers reported perspectives representative of early use of AT, they did not report actual use until children were over two years old. As a whole, a majority of EI providers selected skill-building interventions as a primary intervention across all functional areas for children under two years old and almost a third of the providers continued to select skill-building options even when children were older than two years old.

Accommodation, Adaptation, Universal Design, and AT

In order to gain an understanding of perspectives about definitions of AT, TnT surveyed 967 EI providers and asked them to provide examples of devices they considered to be low and high technology (Wilcox, et al, 2005). Providers were more likely to mention low than high technology devices. However, the same devices (e.g., communication devices) were frequently

mentioned as examples in both the low tech and high tech category. In a retrospective study with families of children with severe disabilities, parents were less interested in the type than in the functionality of an adaptation (Greer, Bacon, & Campbell, 2005). These data as well as other reports (e.g., Lahm & Sizemore, 2002; Parette & Brotherson, 2004) seem to indicate that service providers may not have a clear definition of either what AT devices include or when to use them with children.

Part of the apparent confusion for providers may relate to the different terminology and definitions about AT that are incorporated into federal programs that support individuals with disabilities. For example, each state includes definitions of Durable Medical Equipment (DME) that are eligible for payment under state Medicaid programs. Our TnT data suggested that providers seemed to link their own state definitions of DME, a source of funding for AT, with their personal definitions of high technology AT. The Americans with Disabilities Act (1990) protects rights of individuals with disabilities in a variety of situations and settings including child care programs. Legislation specifies that discrimination can not take place without reasonable accommodation for an individual's disability. Reasonable accommodations include changing facilities so that they are accessible (e.g., installing a ramp into a child care program for a child in a wheelchair) and acquiring or modifying materials (e.g., providing adapted positioning equipment for a child with physical disabilities or special materials for a child who is blind or visually impaired.)

Both the Assistive Technology Act of 1998 (as amended, 2004) and the Individuals with Disabilities Education Improvement Act (2004) include identical definitions for both AT services and AT devices. The definition of devices is expansive and includes any item, equipment, or product system that is used to "increase, maintain, or improve functional

capabilities of an individual with a disability" (CFR 300.5). These definitions are broad, linked specifically to functional capabilities, and incorporate some but not all items that would be likely to be included under Medicaid DME categories or under the reasonable accommodation requirement of the ADA.

AT is beginning to be viewed within a context of universal design, a new concept being incorporated into federal programs. The proposed regulations for IDEA [Federal Register: June 21, 2005 (Volume 70, Number 118)] incorporate this concept by adding the same definition for this term that is included in the Assistive Technology Act. Universal design means "a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly accessible (without requiring assistive technologies) and products and services that are inter-operable with assistive technologies" (CFR 300.43). Essentially, when devices and other materials are designed in such a way as to be useable by people with disabilities, the modifications, adaptations, or special devices that are defined as AT are not needed. Under IDEA, the concept of universal design is strongly linked to assessment and curriculum and is viewed as a way of providing children access to the general education curriculum. When child care or preschool curricula, for example, are designed for children with a range of abilities, then fewer modifications, adaptations, or AT devices are needed for a child with a disability to participate successfully in a program's activities and routines. If playgrounds were designed to accommodate all children's abilities, then the modification and adaptations necessary to provide access and promote participation of a child with a disability at the playground would be minimized.

The often subtle differences in these definitions and terms may make little difference to families who want their children to be able to participate in typical activities and routines or to child care providers or preschool teachers who also have expectations for children's participation. We have taken an approach in our work of combining the reasonable accommodation definitions from the ADA and the AT definitions used in IDEA and the Assistive Technology Act to propose a category of intervention that we have labeled "adaptation."

Types of Interventions

An emphasis in EI programs is on the use of typical activities and routines that occur in natural settings with family members or typical-aged peers (Dunst, Hamby, Trivette, & Bruder, 2000; Dunst et al., 2001). Adaptation interventions, including accommodation and devices, are used to help children participate in typical activities and routines within the everyday settings where they spend time (Campbell, 2004; Mistrett, 2004). AT can be used to both promote participation through the use of devices and help children achieve functional skills such as mobility, communication, play, or self-care (Blackhurst & Lahm, 2003; Mistrett, 2001). Specialized teaching or therapy strategies are another type of intervention used to teach children to perform these same skills naturally or without the use of adaptations or devices (Campbell, 2005). These skill-building interventions are traditionally provided through EI services via one-on-one interactions between therapists or teachers that occur through home visits. In preschool and child care, children may receive one-on-one interactions with therapists or teachers via a "pull out" model. Services that are provided through one-on-one interactions between a child and an adult are generally described as a direct intervention.

Adaptation interventions are an indirect intervention model where therapists and teachers assist in the design, fabrication, and monitoring of interventions that are provided by families and other caregivers within the context of typical activities and routines rather than through separate one-on-one interactions with an adults. Adaptations function as a "bridge" or a mediator between the skills that a child can currently perform and the requirements or expectations of the activity. When there is a mismatch between a child's current abilities and the requirements of an activity, adaptations may allow a child to participate fully even without being able to perform the required skills (Campbell, 2004)

When promoting participation, the focus of intervention shifts from skill-building to using strategies that ensure maximal participation as quickly as possible. Adaptation includes strategies such as AT devices that allow children to participate in the absence of being able to perform skills required in the activity or routine. For example, a child may be unable to participate in art activities at the child care center because she is unable to grasp objects such as art materials, brushes, or crayons without adult assistance. The requirement of an adult to help the child hold and manipulate objects may alter the child's participation in art activities by isolating the child from other children, thereby limiting natural opportunities for peer interaction, communication, or other group expectations. Providing the child with adapted brushes, crayons, or other materials and having the child care program choose art activities that do not require high levels of manipulation of objects may allow the child to participate without adult assistance, thereby providing natural opportunities for communication and social interaction.

Decision-Making Using An Adaptation Hierarchy Framework

A four -step process for making decisions about possible adaptations to promote children's participation in activities and routines is illustrated in Figure 1. It may be helpful to

re-frame skill-building goals (e.g., “use a pincher grasp”; “write four capital letters when provided with a model”; “express wants and needs when asked”) as participation-based outcome statements such as “participate in family mealtimes by feeding himself finger and spoon foods, drinking from a cup, and socializing with family members.” Participation-based outcomes establish the child’s goal as one of participation in a specified activity (or routine) rather than as skill-building although an activity or routine may provide a context in which to practice particular skills (Campbell, 2005b). For example, mealtimes that include finger foods may provide a child with opportunities to practice using a pincher grasp or provide opportunities for communicating wants and needs.

Gathering Information

As an initial step in designing adaptation interventions, providers first work with families or other child caregivers (e.g., child care providers; preschool teachers) to learn about the typical activities and routines in which the child participates or is unable to participate. Family activities include a wide range of situations, some of which are typical across families (e.g., grocery shopping; watching TV), but many of which may be unique and based on family preferences (e.g., playing at the beach). Child care and other group activities (e.g., library story book hour; toddler music or gym programs) also include participation opportunities such as storybook reading, learning centers, gross motor activities, or snack. Family routines occur regularly and often involve caregiving (e.g., bathtime) or family organization (e.g., getting up in the morning; bedtime; mealtimes). In child care, most routines are those that involve caregiving (e.g., diaper changing, toileting, naptime) or provide structure for managing groups of children (e.g., making a transition from one activity to another; leaving at the end of the program). Service providers can learn about activities and routines in a variety of ways ranging from simply having a

conversation with the family or caregiver-teacher to using more structured family assessment techniques. The important thing is to find out about the activities and routines that are not going well as judged from the perspective of the family or caregiver-teacher. The end goal of the process is to promote children's participation in all identified activities and routines but particularly in those that are judged by families or others (e.g., child care staff; librarian) as not going well (Campbell, 2004; 2005).

The second step is to learn about adults' satisfaction with the child's performance in five functional skill areas including communication, social interaction with adults and children, use of hands and arms, and mobility. Children with disabilities may have many performance limitations but these limitations may or may not impact negatively on participation in specified activities and routines. When functional skill abilities negatively influence participation in a particular activity or routine, these limitations may often be reduced or eliminated through use of adaptations. For example, if a child needs to ask for more food or drink during snack time at a child care center, holding the two objects up so that the child can indicate a choice, a picture board that allows a child to point to items or using a simple voice output device can allow the child to participate in snack time and meet adult expectations without being able to talk.

Adaptation Hierarchy Framework

The third step is to use the adaptation hierarchy framework (see Figure 2) for making decisions about possible adaptation strategies to help a child successfully participate in typical activities and routines (Campbell, Milbourne, & Silverman, 2002 a & b). The hierarchy lists categories of intervention strategies from those that are least (at the top) to most (at the bottom) restrictive. Modifying the environment in some way that allows a child to participate or providing a child with specific types of equipment are the least intrusive types of adaptation

strategies. Removing a child from the typical environment so that the child is doing something different with an adult, generally in a one-on-one situation, is the most restrictive. The framework is not meant to suggest that more restrictive options are never needed in particular situations or with certain children but rather that restrictive interventions should not be tried as a first solution and should only be used when other categories of adaptation have been tried with no success.

Intervention strategy categories that are at the top of the chart typically involve accommodations or adaptations to the environment in which an activity or routine occurs. For example, arranging the furniture at home or in a child care program so that the child can get around is an example of an environmental accommodation. Placing heavy sandbags into plastic furniture (e.g., a play kitchen) so that a child can use the furniture safely to pull up to standing is an example of an environmental modification. Purchasing puzzles with big knobs on the pieces or adapting existing puzzles with big knobs allows a child without good manipulation skills to play with other children. When adaptations do not occur, children must be assisted by other children or by adults in order to participate successfully. Requiring assistance from an adult in order to participate in an activity or routine is a restrictive intervention.

Examples of strategies for each of the adaptation intervention categories on the hierarchy are listed on Table 1. Typically developing infants and toddlers share many of the same functional skill limitations as children with disabilities and these limitations are likely to impact on their participation in activities and routines. As a result, much of the equipment, toys, and other items used with typically developing children can be used with children with disabilities if carefully selected and matched to the child's interests and abilities. In a sense, items used with babies have universal design characteristics and may require little to no adaptation to promote

participation with children with disabilities. These items include baby equipment such as highchairs, strollers, toilet chairs, floor sitters, or child chairs that are readily available but need to be carefully selected to provide the types of support that may be needed by a child with a disability. Purchasing carefully-selected toys that match a child's interests and manipulation abilities or can be easily adapted to accommodate for any functional ability limitation also is effective for a majority of infants and young children. Inexpensive adaptations to off-the-shelf items also work well. For example, a preschooler who can physically fit into a motorized off-the-shelf car (e.g., Corvette; Barbie jeep) may be able to use the car for outside mobility with simple adaptations for positioning and switch operation of the car.

Similarly, many of the activities and routines in which infants and young children participate can be easily adapted to allow children with disabilities to participate without any greater amounts of adult assistance than would be provided for a child of the same chronological age. Items used within an activity such as specific materials (e.g., materials in the kitchen area of a child care room; books) or toys often require no adaptation if well selected or minimal adaptation to accommodate a child's functional abilities. A preschooler with disabilities may be able to learn to "write" the letters in his name by moving magnetic letters around on a board or play at the woodworking area if tools are adapted with built up handles. In families, and children's programs where children of a variety of ages are included, older or more competent children may be able to help children with disabilities. Early learning program curricula that use multi-age groupings (e.g., Montessori or Reggio-Emila) offer many opportunities for bringing children together in cooperative working relationships so that children with disabilities have natural forms of assistance.

All of these adaptation strategies can allow a child with a disability to be successful without requiring above-average adult assistance. Obviously, young children require considerable assistance from adults when they are infant or toddler-aged and the amounts and types of assistance decrease as children get older. Children with disabilities are viewed frequently as needing a lot of adult assistance in order to participate in settings that are designed for typical children. A goal in using adaptation interventions is for children to be as independent as other children of the same chronological ages.

Tools for Planning and Documenting Adaptation Interventions

The fourth step is to use the "Here's the Situation: Try This Adaptation" (see Figure 3) planning form to summarize and represent information that has been gathered about a child's participation in a specified activity or routine. The planning form provides structure for brainstorming and identifying potential adaptation interventions in a matrix that lists the functional skills against the steps of the adaptation hierarchy. This form has been used to guide professionals and families in both identification of potential adaptation strategies and decision-making about which strategies to try. The child whose plan is represented on Figure 3 is a 20-month old who enjoys books. In his family, book reading is part of the children's bedtime routine and used to provide a transition between bathing and bedtime as well as an activity that can occur at other times during the day.

The second tool (see Figure 4) is a web that can be used in two ways. One is to represent how a particular activity provides opportunities for a child to practice various functional skills. When successful adaptations to an activity occur, children are not only able to participate in the activity but are also provided natural opportunities for learning and practicing skills. Skills may be those that are developmentally appropriate for all children of a particular chronological age

or have been identified for learning on the child's IFSP or IEP. Figure 4 illustrates the web for the same child whose "Here's the Situation" plan is illustrated on Figure 3. Webs provide a context for integrating the perspectives and expertise of various disciplines and help families understand how family activities and routines are important to children's learning of developmental skills such as communication, social interaction, mobility, and arm and hand use abilities. Representing opportunities for learning within the context of a particular family activity or routine may help families to understand how they are effective teachers for their children.

It is not unusual for children's abilities in a particular functional skill area to limit participation in more than one activity or routine. For example, when children have difficulty communicating, their inability in this area may impact on participation in more than one activity or routine. A second way that webs may be used is to represent the ways in which a particular adaptation intervention can be used across activities and routines. The web in Figure 5 illustrates how an adaptation for communication can be integrated into various activities and routines. This web was designed for a 40 month old girl who attends a child care center while her mother is at work. Molly is the only child with a disability in her child care classroom and her difficulties with communication influenced her abilities to participate successfully in most child care activities. When she was unable to communicate successfully, she often became frustrated and resorted to inappropriate behavior (such as crying, throwing objects, hitting) to gain the attention of the other children or teachers. A series of communication options were designed to be used across the activities in her child care program and were represented for the teacher and family on a web so that the use of these strategies were illustrated across activities.

Conclusion

The potential of adaptation interventions is substantial. However, service providers may not readily use adaptation interventions because they are more focused on traditional skill building than on children's participation in activities and routines (Bruder, 2000) or because they are unaware of decision-making strategies or of potentially helpful resources. All providers should be aware of AT resources provided through their Part C lead agency, through special education in their state Departments of Education, or the agency that administers the state's Assistive Technology Act grant. By using these resources, many states have been able to offer training about AT generally, devices within a particular skill category (e.g, Augmentative and Alternative Communication – AAC), or on specific devices. Some states provide annual Expos where devices can be seen and tried and manufacturers or distributors can answer questions. These opportunities are generally directed to AT applications with individuals of all ages and may not be specific to AT with infants and young children.

Lending libraries are a helpful and effective resource for learning about devices and obtaining them for trial before purchase. Some states have established lending libraries within community facilities such as public libraries and others provide these programs on a regional or state-wide basis. Lending libraries are also operated by private organizations such as Easter Seal or United Cerebral Palsy Associations and by Lekotek; however, all of the local affiliates of these organizations do not necessarily have lending libraries and Lekotek is well established in only a few states. In some states, the devices that are available for borrowing are listed on a website so that a provider or parent can learn about the range of devices that may be available and where they are located. While some lending libraries mail devices and include return postage, others require parents or professionals to go physically to a location to borrow the device. Most lending libraries have both low- and high-technology items available to borrow

but, in general, available items are more likely to be considered as high-technology. Providers should explore public and private resources in their own states and familiarize themselves with what items are available to borrow, any eligibility requirements, and procedures for obtaining and trying devices.

Trying out devices is often helpful, particularly with high-technology or specialized devices that may be both costly and complicated. Sometimes a device that seems plausible may not work well in given situations. With infants and young children, high-technology devices are seldom needed. What the device does may not "match" a child's developmental abilities or may be more complicated than what is needed in a given situation. Bathtime can become successful for an infant or toddler who is unable to sit up without assistance by using an off-the-shelf infant bathing seat or another type of simple adaptation and may not require purchase of an expensive commercial bath seat made for individuals with disabilities. A preschooler with a disability may be able to participate at the classroom computer learning station by accessing the computer with a touch screen and this adaptation may be used by the other children in the classroom. When the child is in elementary school and keyboarding skills are used, a more complicated adaptation may be necessary for computer use.

Adaptation has the potential to be a powerful intervention with infants and young children. Well-designed adaptation interventions can assist infants and young children to participate in everyday activities and routines successfully and provide access to the natural learning opportunities that occur within activities and routines. By using planning strategies, webs, lending libraries and other resources, providers can design effective adaptation interventions and try them out to document their success with infants and young children.

References

Americans with Disabilities Act of 1990, P.L.

Assistive Technology Act of 1998 As Amended (2004), P. L. 108-364.

Blackhurst, E. & Lahm, L. (2000). Functional decision making model for assistive technology. In J. Lindsey, Ed. *Computers and exceptional individuals* (Revised ed. pp. 159-177). Columbus: Merrill.

Bruder, M. B. (2000). Family-centered early intervention: Clarifying our values for the new millennium. *Topics in Early Childhood Special Education, 20* (2), 105-115.

Campbell, P. H. (2005). Addressing motor disabilities. In M. E. Snell & F. Brown (Eds.) *Instruction of students with severe disabilities* (6th edition*),* pp 291-327. New York: Prentice Hall/Merrill.

Campbell, P.H. (2005). *Monitoring progress in early intervention - outcomes to measurement: A self-study guide.* (Available from Thomas Jefferson University, Child and Family Studies Research Programs, 5th Floor Edison, 130 S. 9th St., Philadelphia, PA 19107)

Campbell, P.H. (2004). Participation-Based services: Promoting children's participation in natural settings. *Young Exceptional Children*, 8(1), 20-29.

Campbell, P. H., & Milbourne, S.A., Silverman, C. (2002a). *Philadelphia Inclusion Network, Instructor Guidelines*. (Available from Thomas Jefferson University, Child and Family Studies Research Programs, 5th Floor Edison, 130 S. 9th St., Philadelphia, PA 19107); Retrieved July 1, 2005 from http://jeffline.jefferson.edu/cfsrp

Campbell, P. H., Milbourne, S. A., & Silverman, C. (2002b). *Philadelphia Inclusion Network, Participant Materials*. (Available from Thomas Jefferson University, Child and Family

Studies Research Programs, 5th Floor Edison, 130 S. 9th St., Philadelphia, PA 19107); Retrieved July 1, 2005 from http://jeffline.jefferson.edu/cfsrp.

Campbell, P.H. & Wilcox, M. J. (2004). *Briefing book: Tots n tech research institute on assistive technology for infants and toddlers.* (Available from Thomas Jefferson University, Child and Family Studies Research Programs, 5th Floor Edison, 130 S. 9th St., Philadelphia, PA 19107)

Dugan, L., Campbell, P.H., & Wilcox, M. J. (2005). *Decision-making about assistive technology use with infants and toddlers.* Manuscript submitted for publication.

Dunst, C. J., Bruder, M. B., Trivette, C., Hamby, D., Raab, M., McLean, M. (2001). Characteristics and consequences of natural learning opportunities. *Topics in Early Childhood Special Education, 21*(2), 68-92.

Dunst, C. J., Hamby, D., Trivette, C. M., Raab, M., & Bruder, M. B. (2000). Everyday family and community life and children's naturally occurring learning opportunities. *Journal of Early Intervention, 23*(3), 151-164.

Greer, D. C., Bacon, C., & Campbell, P. H. (2005). *A retrospective look at families' perspectives of assistive technology with young children.* Manuscript submitted for publication.

Hebbeler, K. (personal communication, November 3, 2003)

Individuals with Disabilities Education Improvement Act of 2004, Pub L. 108-446.

Individuals with Disabilities Education Improvement Act of 2004 Proposed Regulations, *Federal Register*: June 21, 2005, v 70(118).

Lahm, E. A., & Sizemore, L. (2002). Factors that influence assistive technology decision-making. *Journal of Special Education Technology, 17*(1), 15-26.

Lesar, S. (1998). Use of assistive technology with young children with disabilities: Current status and training needs. *Journal of Early Intervention*, 21(2), 146-159.

Mistrett, S. (2004). Assistive technology helps young children with disabilities participate in daily activities. *Technology in Action, 1*(4), 1-8.

Mistrett, S. (2001). *Synthesis on the use of assistive technology with infants and toddlers (birth through age two)* (Contract No. HS97017002, Task Order No. 14). Washington DC: U.S Department of Education, Office of Special Education Programs, Division of Research to Practice.

Parette, H. P., & Brotherson, M. J. (2004). Family-centered and culturally responsive assistive technology decision-making. *Infants and Young Children, 17(4)*, 355-367.

Technical Assistance Project (2000, July). Update on the use of assistive technology among infants and toddlers. *TAP Bulletin*, 1-8.

U.S. Department of Education. (2002). *Twenty-fourth annual report to congress on the implementation of the Individuals with Disabilities Education Act*. Washington, DC: U.S. Government Printing Office.

Wilcox, M. J., Guimond, A., & Campbell, P. H., & Moore, H. (2005). *Tots and tech: a national survey of early intervention providers.* Manuscript submitted for publication.

Table 1

Examples of Adaptation Interventions

Adaptation Hierarchy Level	Examples
Adapt Set-Up of Environment	Moving furniture within the home to allow a child to walk with a walker; placing all unsafe materials (such as cleaning solutions) in a locked cupboard
Adapt/Select "Equipment"	Using boppies and bean bag chairs in a child care program so that children can sit with support; purchasing a particular brand off-the-shelf stroller or off-the-shelf toilet chair in which a child can sit comfortably and safely
Equipment/Adaptations for Positioning	Using a stander so that the child can work with others at the sand table; obtaining a customized chair that positions the child
Adapt Schedule	Allow longer times for mealtime so that a child who needs more time to self-feed will have enough time to complete the meal; plan an art activity where children complete two projects to provide enough time for a child with a disability to complete one project
Select or Adapt Activity	Reading a story using props so that children may participate actively while listening; incorporating a variety of riding toys into outside play so that all children can ride; making sure that one riding toy can be used by the

Adaptation Hierarchy Level	Examples
	child with a disability either through selection or adapting existing toys
Adapt/Select Materials & Toys	Purchasing an off-the-shelf puzzle with knobs so that the child can complete the puzzle independently; attaching a switch to a toy so that the child can play with the toy independently
Adapt Requirements or Instructions	Allowing a child to self-feed for the beginning of the meal and then feeding the child for the remainder; Read 2 very short stories and require a child who has difficulty attending to attend for one story only.

Figure 1. A four-step process for making adaptation decisions to promote children's participation in activities and routines.

- **Identify one or more activities that the family/child participate in outside of the home (e.g., playground; shopping); and/or**
- **Identify activities that occur within group situation such as child care or community activities (e.g., swimming lessons); and**
- **Identify family routines or routines that occur in group settings (e.g., child care, preschool)**
- **Find out which activities/routines go well for the family and which they are not satisfied with and/or do not go well**

↓

- **Find out how satisfied the family is with the child's performance in five functional ability areas:**
  - **Communicating with children; adults**
  - **Interacting with adults – caregivers & non-caregivers**
  - **Interacting with children**
  - **Using hands and arms**
  - **Getting around from place to place**

↓

Use the Decision-Making Adaptation Hierarchy to Design Adaptation Interventions

↓

Use the Here's the Situation – Try These Adaptation Planning Tools

Figure 2. A hierarchy for designing adaptations that include assistive technology devices and range from environmental accommodations to adult assistance.

- **Environmental Accommodations**
  - **Adapt Set-Up of Environment**
  - **Adapt/Select "Equipment"**
  - **Equipment/Adaptations for Positioning**
- **Adapt Schedule**
- **Select or Adapt Activity**
- **Adapt Materials & Toys**
- **Adapt Requirements or Instructions**
- **Have Another Child Help -- Peer/Sibling Assistance**
- **Have an Individual Child Do Something Different (within the same activity)**
- **Have an Adult Help a Child Do the Activity**
- **Have an Individual Child Do Something Outside of the Activity Context (with an Adult)**

Figure 3. The "Here's the Situation: Try This Adaption" form was completed for a 20 month old whose family used storybook reading as part of their bedtime routine.

Using Adaptations & Assistive Technology to Promote Children's Participation & Learning
Here's the Situation --- Try this Adaptation!!

Activity or Routine: Reading stories at home with mom and brother

What is happening now?

Mom sits the two boys on the sofa beside her so that MJ can be propped up to sit and be close to the book. MJ looses interest in reading because he is unable to see the book, help turn the pages, or "talk about" what is going on in the story. He enjoys reading and may cry or fuss which makes the situation difficult for the adult and other children.

Desired Outcome:

MJ will participate in reading a book with his mom and brother by listening, "talking" about the story, & helping to turn the pages.

☒ **Can use the adaptation/AT without teaching** ☐ **Needs teaching or practice to use AT: Describe:**

	Step	
☒	Adapt Set Up of Environment	Turn off/lower TV
☐	Adapt/Select Equipment Needed for Activity	
☒	Equipment/Adaptations for Positioning	Prop with pillows, boppie

			Communication	Socialization/ Interaction	Using Hands & Arms	Getting Around (Mobility)
☒	Adapt Schedule	Read in morning when MJ not tired; & before bed				
☒	Adapt/Select Activity		Show 2 books; have MJ choose by reaching/pointing to book & vocalizing			
☒	Adapt Materials/Toys	Use books with large pictures; cardboard pages; make Velcro page turners; home-made books		Provide opportunities for both boys to turn pages	Provide opportunities for MJ to turn pages; guide as needed	
☒	Adapt Requirements or Instructions	Use animated voice when reading	Ask questions about story "where is ___" MJ respond by reaching/pointing & vocalizing	Give opportunities for turn taking between MJ & brother		

Figure 4. Webs can be used to represent a child's skill learning opportunities within a particular activity or routine as is illustrated in this web of a bedtime routine of storybook reading.

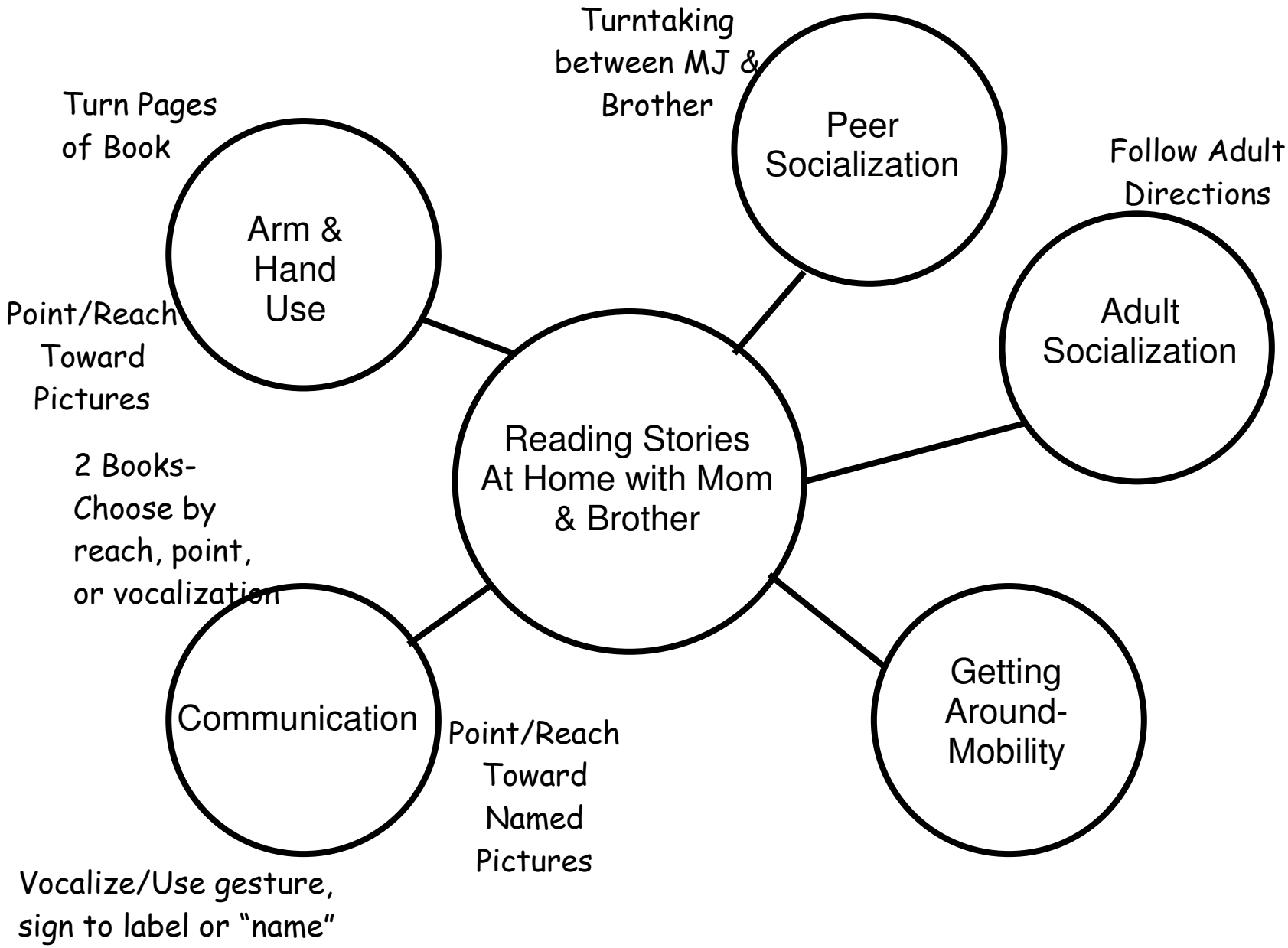
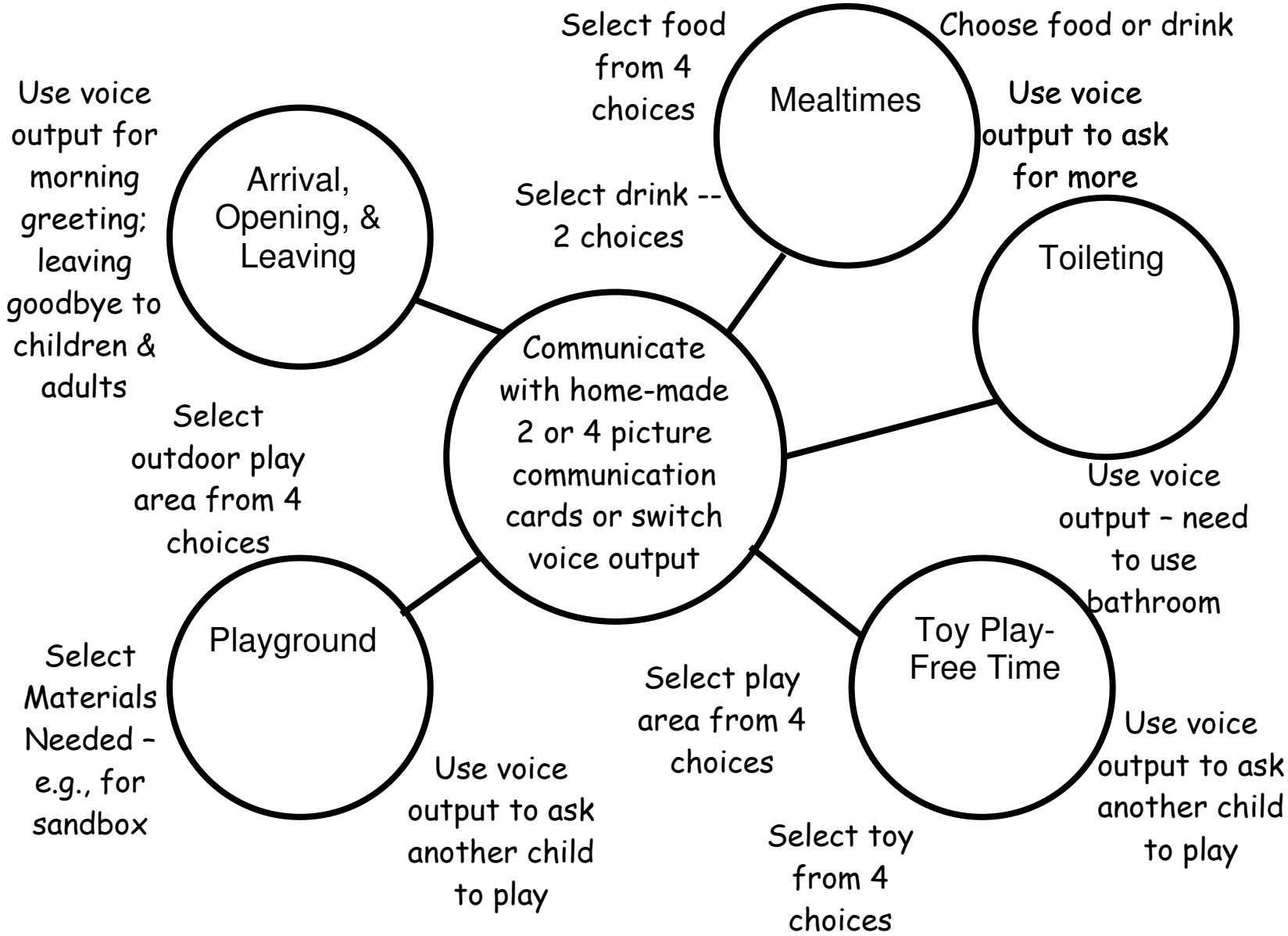

Turn Pages of Book
Arm & Hand Use
Point/Reach Toward Pictures
Turntaking between MJ & Brother
Peer Socialization
Follow Adult Directions
Adult Socialization
Reading Stories At Home with Mom & Brother
2 Books- Choose by reach, point, or vocalization
Communication
Point/Reach Toward Named Pictures
Vocalize/Use gesture, sign to label or "name"
Getting Around- Mobility

Figure 5. Children's functional skill abilities may negatively influence participation in more than one activity or routine. Webs can be used to represent the ways in which particular adaptation interventions may be incorporated into more than one activity or routine.


Communicate with home-made 2 or 4 picture communication cards or switch voice output
Arrival, Opening, & Leaving
Use voice output for morning greeting; leaving goodbye to children & adults
Mealtimes
Select food from 4 choices
Select drink -- 2 choices
Choose food or drink
Use voice output to ask for more
Toileting
Use voice output – need to use bathroom
Toy Play-Free Time
Select play area from 4 choices
Select toy from 4 choices
Use voice output to ask another child to play
Playground
Select outdoor play area from 4 choices
Select Materials Needed – e.g., for sandbox
Use voice output to ask another child to play