Creating Educational Adaptations, Accommodations, and Modifications

CHAPTER OBJECTIVES

1. Become familiar with the key elements of adaptations, accommodations, and modifications used to support students in their school communities.

2. Recognize the need for developing individualized adaptations for students with severe and multiple disabilities to support their inclusive academic involvement and membership in their school community.

3. Learn the four-step process to developing and implementing adaptations for students with severe and multiple disabilities in general education settings.

4. Discover how specific adaptations for Jack, a sixth-grade student, promote independence and interdependence and allow for meaningful participation with his classmates and with the academic curriculum.

5. Understand 10 key considerations when creating adaptations for students with severe and multiple disabilities.

KEY TERMS
- Accommodations
- Adaptations
- Assistive technology (AT)
- Discrepancy analysis
- Modifications

Portions of this chapter appearing in the third edition of this book were rewritten and updated by Alice Udvari-Solner and Julie Causton-Theoharis. Earlier versions contained critical elements that remain pertinent and were therefore preserved. We thank the original authors, Jennifer York-Barr, Beverly Rainforth, and Perrin Locke, for their significant contributions. This chapter is dedicated to Sam Theoharis, who was Jack’s classmate during the writing of the first edition of this chapter and is now Jack’s classmate.
Jack is an 11-year-old boy with physical and intellectual disabilities who requires extensive supports. He is involved in all social and academic aspects of sixth grade through adaptations, accommodations, and modifications. When you see Jack move through the hallways in between classes in his middle school, you hear many of the students acknowledge, “Hey Jack” and “What’s up?” Jack has his iPad set up with phrases such as what’s going on? great to see you! and hey! as he passes in his wheelchair. Several students slow down to wait for his response to their greeting, and many of his friends stop and wait for a fist bump.

Jack, like so many other students with severe and multiple disabilities, uses a variety of adaptations to support his academic involvement and membership in his school community. Accommodations and modifications are adaptations to instruction, the environment, or materials that help someone accomplish a task more effectively. Accommodations are changes in how a student gains access to information and demonstrates learning that do not substantially change the instructional level, content, or performance criteria. For example, Jack does not have the motor capabilities required for speech. Consequently, his iPad speaks his greetings as he moves through the hallways. In addition, he requires peer support for notetaking and tape recordings of lectures. In contrast, modifications are changes in what a student is expected to learn in order to provide meaningful and productive participation (Causton-Theoharis, 2009). For example, instead of writing an essay about the arc of plot and character development in the novel Esperanza Rising (Ryan, 2002), Jack may be expected to create a digital story highlighting character reactions to a series of episodes in the novel.

The need for adaptations is significantly intensified as Jack and other students with severe and multiple disabilities are more frequently included in general education environments. Research shows that the appropriate use of adaptations can increase student academic-related responses and student engagement (Lee, Wehmeyer, Soukup, & Palmer, 2010) and result in improved learning and fuller participation (Kurth & Keegan, 2012). Educators and other professionals therefore must be able to identify the need for, develop, and implement educational adaptations or AT devices.

This can initially seem like a formidable task to educators and others with little experience in creating adaptations for students with significant disabilities. A student’s competence and intelligence sometimes may be called into question, and educators may wonder what the student is learning or gaining. This situation likely occurs because many students with significant disabilities often have difficulties with communicating and, consequently, educators are presented with unique challenges in assessing what is being learned. Presuming competence, however, is an important principle in educating students with severe and multiple disabilities and is based on Donnellan’s (1984) initial idea of making the least dangerous assumption about a student’s ability to learn.
(see Chapter 10). Biklen and Burke (2006) reiterated the importance of presuming competence, explaining that outside observers (e.g., therapists, teachers, parents) have a choice in how they see a child with disabilities. It is always better and far less dangerous to assume that students can learn than to expect that they cannot. It is important to recognize that no one can definitively know another person’s thinking unless the other person (accurately) reveals it. Educators have been repeatedly surprised about what students can communicate, learn, share, and do when given the opportunity. This chapter presents a process to assist educators in developing and implementing adaptations to increase the participation of people with significant disabilities in school environments. The following sections provide examples of how this strategy was used to create adaptations for Jack, the middle school student introduced at the beginning of this chapter. The process for creating adaptations is applied to various aspects of Jack’s educational programming. Jack’s experiences illustrate how creative use of adaptations can increase meaningful participation, provide access to the Common Core State Standards (CCSS) (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), and promote friendships in general education environments. This chapter highlights recommended practices and current ATs, provides reproducible templates and charts, and concludes with a discussion of considerations related to the effective use of adaptations.

**PROCESS OF DEVELOPING INDIVIDUALIZED ADAPTATIONS**

The four-step process for developing adaptations is grounded in an ecological approach and draws from foundational concepts formulated by researchers in the field (Baumgarten et al., 1982; Brown et al., 1979, 1980; Brown, Shiraga, York, Zanella, & Rogan, 1984a, 1984b; Downing, 2010; Falvey, 1995; Ferguson & Baumgarten, 1991; Piuma & Udvari-Solner, 1993a, 1993b; Udvari-Solner, 1995, 1996). The process provides a series of questions that guide observation and provide a framework for identifying student needs and developing adaptations (see Figure 11.1). They are designed to facilitate dialogue, problem solving, and decision making among team members, resulting in adaptations and support that promote active participation and skill development for students with disabilities. Research shows that this type of collaboration process among team members is essential for the successful inclusion of students with disabilities (Bauer, Iyer, Boon, & Fore, 2010; Carter, Prater, Jackson, & Marchant, 2009; Causton-Theoharis, 2009; Hernandez, 2013). Identifying the abilities, strengths, needs, and overarching educational goals of the student and the inclusive environments in which these goals can be achieved is the first step in the process. These identified educational goals and environments will serve as an essential guide for determining the student’s needed accommodations, adaptations, and modifications. Gathering information about the student’s abilities, strengths, and needs allows the educational team to develop a more complete student profile, which is essential when
determining strategies and supports for effective teaching. Determining the activities and skills necessary to participate in the environment and observing how the student engages in these activities and skills is the second step. This step provides the opportunity to identify and analyze the student's areas of difficulty, referred to as performance discrepancies, and hypothesize why these discrepancies exist. Understanding the potential intellectual, motor, sensory, and behavior characteristics attributed to performance discrepancies is essential for targeting a student's priority instructional goals and designing effective interventions (Piuma & Udvari-Solner, 1993b).

Educators can choose from four interventions to address performance discrepancies in the third step. One is to teach the student to perform the skill in the same way that a person without a disability would perform it. For example, a student who is unable to carry his or her science lab materials to the lab table might be taught to do so in a way identical to how his or her classmates without disabilities perform the skill. If a student is unlikely to learn essential intellectual, motor, or sensory requirements for performing a skill in a typical manner, then an adaptation is one way to accommodate the difficulties. Employing instructional adaptations that modify the requirements of the task is the second
option for intervention. For example, the student might be taught to carry each lab item individually. The third option involves using adaptive materials or devices. For instance, a student carries lab items in a basket attached to his or her walker. The fourth option is to omit minor activities or skills if the student is already meeting his or her priority instructional goals and fully participating with peers.

Implementing and evaluating the intervention strategy is the final step of the process and encourages educators to provide systematic instruction and engage in ongoing evaluation and progress monitoring of performance (Piuma & Udvari-Solner, 1993b). Evaluations should emphasize whether the adaptation is increasing access to skills, peer interaction, and independence.

The following sections explain the actions to take when completing each of the four steps presented in Figure 11.1 and provide an example of the process at work as Jack gives a presentation about Mount Vesuvius in his sixth-grade physical systems of the environment (science) class.

**Step 1: The Learner and the Environment**

Educators begin to develop effective and appropriate adaptations by extensively learning about their students. Gathering information that results in a profile of the student's social and academic abilities, strengths, and learning concerns is an essential first step. These facts help establish a shared vision of the student's active involvement for the team and can reveal pertinent strategies for effective teaching (Causton & Tracy-Bronson, 2015; Udvari-Solner, Villa, & Thousand, 2002, 2005).

**What Are the Student's Strengths, Abilities, Needs, and Priority Goals?**

Knowledge of the student's preferences and learning style, past instruction, and reliable physical and motor movements (especially for a student with severe and multiple disabilities) will affect the selection of adaptations. Information gathering and sharing must be collaborative and include the learner, the family, past and current teachers, peers, and others close to the student.

Jack's challenges or disabilities can be described as follows. Jack has significant and multiple disabilities that necessitate the use of a variety of supports and assistance. Jack has muscular dystrophy, which considerably limits his gross and fine motor abilities. He also has a metabolic disorder that causes him to have varying energy levels. He needs frequent breaks and snacks to give him the energy needed to function throughout each school day. He has a significant intellectual disability that affects his ability to respond to questions or engage in academic tasks. He does not use verbal speech but uses eye pointing or hand selecting to communicate choice. He also communicates through facial expressions and body movements. He requires a wheelchair for mobility and uses a non-electric wheelchair because he is unable to drive it independently. Jack is able to move his arms and hands and grasp objects independently but has difficulty reaching for items. These abilities vary considerably day to day based on his physical status. Figure 11.2 provides a student profile of Jack and describes...
his skills and abilities for the purposes of designing appropriate adaptations. Jack's parents and educational team identified the following educational priorities:

- Increasing self-initiated communication with peers, general educators, and the public, which includes expressing his preferences and needs, making requests, and responding to questions
- Increasing comprehension of vocabulary associated with instructional units/topics in sixth grade and synthesizing information into 5–10 big ideas for each curricular topic
- Increasing his access to and use of a computer-generated voice output device
- Reaching and grasping, assisting in movements guided by others, and moving his legs purposefully
- Using eye gaze to consistently select and make choices

Background information about the student and the student’s priority educational goals should guide the next step of selecting relevant environments for instruction.

**What Are the Specific Inclusive Environments in Which These Goals Can Be Achieved?** Selecting the environments in which the student’s educational goals can be accomplished is the second phase of Step 1 in the process of developing adaptations. These environments should promote access to and participation in general education curriculum and instruction, a priority for a school-age student. In addition, home, community, and work environments for older students should be identified in which the students are functioning or will be expected to function in the future. Environments are determined individually for each student with inclusive age-appropriate criteria in mind.

Core sixth-grade classes (e.g., social studies, language arts, science), exploratories (e.g., art, physical education, music), and extracurricular clubs are critical environments for Jack. The mall, local restaurants, the neighborhood pool, and the YMCA are other environments of importance to Jack. The sixth-grade general education classroom will be selected as the inclusive environment of choice in the four-step process used to develop adaptations for Jack because it is where Jack’s typically developing sixth-grade peers are educated, and it is the best location for learning the content. This decision is clearly supported under the least restrictive environment clause in the Individuals with Disabilities Education Improvement Act (IDEA) of 2004 (PL 108-446). In addition, it meets Jack’s preferences and his family’s desire that he be included in all academic subject areas and given access to standards-based curriculum.

**Step 2: The Discrepancy Analysis**

Important questions to address when determining a student’s performance discrepancies are presented in the following subsections.

**What Are the Required Activities and Skills in the Environment?** First, the expected activities and skills (referred to as the activity sequence in Figure 11.3) within the environment are identified. This outline of sequential skills and the assessment that follows has been referred to as a discrepancy analysis (Brown et al., 1984b; Downing, 2010; Falvey, 1995; Kurth, 2013). This sequence serves as a guide for assessing the performance of the target student. It is important to note, however, that there are multiple ways to accomplish any activity; there is not necessarily a right way, a wrong way, or a universal standard. The team should try to select the most logical and efficient method to carry out the task as the outline of skills is generated. An activity sequence required to complete a sixth-grade science project on Mount Vesuvius is detailed in the first column of Figure 11.3.
<table>
<thead>
<tr>
<th>Activity sequence</th>
<th>Jack's activity sequence</th>
<th>Potential reasons for discrepancy</th>
<th>Intervention options</th>
</tr>
</thead>
<tbody>
<tr>
<td>(What are the expected activities and skills in the environment?)</td>
<td>(How does the student perform in the environment?)</td>
<td>(What are the factors preventing a target student from performing the expected tasks?)</td>
<td>(What should the teacher do to support the student and mitigate the discrepancy?)</td>
</tr>
<tr>
<td>To begin the Mount Vesuvius project, students are asked to select partners.</td>
<td>Jack listens to the teacher's directions. He makes eye contact with a peer of his choice. He is able to power his wheelchair over to the peer without difficulty. Jack is unable to ask the student to be partners.</td>
<td>Student learning factors</td>
<td>Assistive technology Jack uses his switch to activate his iPad voice output app to ask a prerecorded message: do you want to be my partner?</td>
</tr>
<tr>
<td>Students read about Mount Vesuvius in a common text.</td>
<td>Jack is unable to read the text independently.</td>
<td>Student learning factors</td>
<td>Instructional adaptation Jack's partner reads the text aloud.</td>
</tr>
<tr>
<td>Students research additional information on Mount Vesuvius from at least three different sources.</td>
<td>Jack is unable to independently research additional sources on his iPad.</td>
<td>Student learning factors Physical, sensory, or motor factors</td>
<td>Omit the task Jack's partner will research additional information and jot down main ideas and supporting details.</td>
</tr>
<tr>
<td>Students create a PowerPoint that includes several main points about Mount Vesuvius and 9-12 supporting details and/or examples.</td>
<td>Jack is unable to verbally communicate main points or supporting details. Jack is unable to manipulate the iPad or computer to independently create the PowerPoint.</td>
<td>Student learning factors Physical, sensory, or motor factors</td>
<td>Instructional adaptation Give Jack's partner instruction about asking Jack for input using yes/no prompts. Instructional adaptation Jack's partner reads suggested main points aloud and asks for Jack's preference using yes or no prompts. Assistive technology Jack eye-points yes or no using the Proloquo2Go app on his iPad to communicate his selections.</td>
</tr>
</tbody>
</table>
| Students choose visual elements to include in their PowerPoint presentation. | Jack is unable to Google images independently.  
Jack is unable to verbally communicate his choices. | Student learning factors  
Physical, sensory, or motor factors | Assistive technology  
Jack eye-points yes or no using the Proloquo2Go app on his iPad to communicate his selections. |
|---|---|---|---|
| Students socialize during partner work. | Jack is unable to respond to spontaneous conversation with his partner. | Student learning factors | Instructional adaptation  
Give Jack's partner instruction about asking Jack yes/no questions about familiar topics.  
Assistive technology  
Jack eye-points yes or no using the Proloquo2Go app on his iPad to communicate his selections  
Jack activates prerecorded conversational questions on his iPad using his switch. |
| Students present PowerPoint to the class. | Jack is able to sit next to his partner in the front of the class.  
Jack is unable to present information verbally or request questions from the class.  
Jack is unable to manipulate the computer to change the PowerPoint slides. | Student learning factors  
Physical, sensory, or motor factors | Instructional adaptation  
Give peers some instruction on how to record short messages on Jack's iPad voice output app.  
Assistive technology  
Jack activates his switch to 1) change PowerPoint slides projected on the SmartBoard and 2) activate recorded messages on his iPad to present information and request questions. |
| For homework, students create a labeled diagram of Mount Vesuvius using 5-10 vocabulary words. | Jack is unable to independently illustrate or label a diagram. | Student learning factors  
Physical, sensory, or motor factors | Omit the task |
<table>
<thead>
<tr>
<th>Factor affecting performance</th>
<th>Guiding questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student learning factors</td>
<td>Has the student been observed performing the same or similar activity sequence in other contexts (e.g., at home, in the community, in the classroom)? Does past experience with learning rate, style, and abilities indicate that it is feasible for the student to learn the task as expected? Do the student's unique learning characteristics preclude him or her from engaging in specific steps (e.g., the student has a very brief short-term memory and is unable to remember more than one direction at a time)?</td>
</tr>
<tr>
<td>Instructional factors</td>
<td>Has the instructional sequence been communicated to the student in ways that match his or her primary modalities (e.g., picture sequence, written or verbal directions)? Will the student benefit from more intensive instruction? Does the instructional sequence need to be modified (e.g., Are there too many steps or too few? Do the steps need to be rearranged?!)? Is the pacing of instruction correct for the student (e.g., Does the student need more time between steps)? Is the level and type of teacher assistance correct?</td>
</tr>
<tr>
<td>Physical, sensory, or motor factors</td>
<td>If the activity requires the use of specific physical movements, does the student have the necessary fine or gross motor movements to complete the task? If the student has the necessary basic motor movements and responses, but they are weak, without intention, or disorganized, does the student have the potential to build and strengthen these responses through instruction, practice, and/or therapy services? What are the student's preferred movements? Is it possible to select a way to do the activity that builds on these movements? What is the student's endurance level? Can the endurance be increased through practice, position, or better physical arrangements (e.g., standing versus sitting)? Does the student experience any sensory difficulties? Does the nature of these difficulties preclude the student from performing any parts of the task? Specifically, does the task have inherent tactile, visual, or auditory cues that must be followed?</td>
</tr>
<tr>
<td>Motivation factors</td>
<td>Is the environment and activity motivating? If not, is there another location that would be more motivating? Would the student be more motivated by working with a peer than with the selected instructor? Does the student fall asleep during the task? Is the sleepiness caused by the environment, avoidance, or physical/health reasons? Are inappropriate behaviors interfering with performance or required skills (e.g., falling asleep, self-stimulation)? Have proactive behavioral strategies been employed within the context of the environment and task? Does the student have opportunities to express preferences and choices through the work day, and are communication attempts (verbal and nonverbal) acknowledged by instructor or peers?</td>
</tr>
<tr>
<td>Environmental factors</td>
<td>Does the student have easy access to the environment and necessary materials? Is the immediate work area too confining or cluttered for the student to perform? If the student uses a wheelchair and needs to be taken out of the chair during instruction, is there a location where this can be done without bringing undue attention, or can alternative seating be arranged for continued participation in the activity? Is the lighting sufficient? Is the noise level of the environment tolerated or agreeable to the student?</td>
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</table>

Step 3: Four Intervention Options

Next, team members must decide how the discrepancies and the priority skills will be addressed. Teams must use their knowledge of the student, their inferences as to the cause of the discrepancy, and their collective expertise to select from four intervention options. The decision is then made whether to teach the skill directly (i.e., the way the skill is typically expected to be performed), employ an instructional adaptation, use AT that will enable greater and more independent participation, or omit a minor skill or activity if the student fully participates with peers and has already met his or her priority goals.

**Teach Directly** The decision to teach directly is made only when it is feasible for the student to learn and perform the skill as would a peer without a disability. Given Jack’s performance discrepancies in science class, the team decided his needs would be best addressed through the use of instructional adaptations and AT. The following sections describe these adaptations and provide examples specific to Jack. The fourth column in Figure 11.3 summarizes the interventions determined for Jack.

**Instructional Adaptations** Four types of instructional adaptations are considered when teaching skills to students with significant and multiple disabilities: 1) modify skills or activities; 2) modify the physical environment; 3) modify rules, policies, or procedures; and 4) provide personal assistance. These forms of adaptation give educators the option to alter aspects of instruction, conditions in the environment, or the way in which people exchange support.

**Modify Skills or Activities** This type of adaptation involves changing typical skill sequences or the way the task is completed. Ways of learning and performance expectations may be tweaked, revised or completely changed. Jack cannot independently read the information on Mount Vesuvius or verbally make his choices about what important information to include in the presentation. Rather than having Jack read, his peer partner can read the information aloud and jot down main points. The peer can be given instruction on how to pose yes/no questions to Jack and use this prompt to assist him in selecting key points to be included in their presentation. The need for Jack to verbally state his choice is eliminated and replaced with another pertinent communication skill. Along a similar vein, peers could be taught to read Jack’s eye pointing or facial expressions so that he could indicate his preferences about what images, colors, or graphics to use in the creation of his group’s PowerPoint presentation.

Another instructional adaptation that modifies the skills required in completing a task is employed during Jack’s conversation with his peer partner. While working on in-class projects, partners typically have a spontaneous conversation in which they ask and answer a jumble of open-ended questions. Jack’s communication difficulties do not allow him to express complex responses on the spot. Consequently, the skills required are modified by teaching his peers to ask a range of yes/no questions about familiar topics. Jack can then
affirm or negate these questions with facial expressions or eye-point to the yes/no options on his Proloquo2Go iPad app.

In order to participate in the presentation portion of the activity, Jack’s partner was easily taught to program Jack’s iPad with the information Jack selected to share using the simple voice output app. The specific use of AT is discussed in greater detail in the AT section.

**Modify the Physical Environment**  Making adjustments to the physical surroundings or environmental conditions is the second type of instructional adaptation. Accommodations that facilitate accessibility, such as creating curb cuts, ramping entryways to buildings, rearranging furniture to create space for maneuvering a wheelchair, and modifying public transportation vehicles with lifts are the most common examples.

Environmental modifications also relate to conditions such as lighting, noise level, visual and auditory input, and location of materials. Elements of the environment may need to be consciously engineered for students who experience sensory impairments, physical disabilities, information processing difficulties, or communication difficulties. Accommodations in this category are required by the Americans with Disabilities Amendments Act (ADA) of 2008 (PL 110-325).

Jack did not face environmental barriers in the science classroom. There was sufficient room to maneuver his wheelchair to work with a partner and to present at the front of the classroom. Yet, moving a futon couch into the student commons area—a place used by all students to gather and socialize during free periods—is an example of a significant environmental adaptation for Jack. The futon offered a location for Jack to get out of his wheelchair and sit or recline in a relaxed position. This age-appropriate environment offered Jack an alternative to an isolated physical therapy room when he needed breaks from his wheelchair.

**Modify Rules, Policies, or Procedures**  Changing the usual patterns, practices, or customs of a particular environment is the third type of instructional adaptation. The informal or formal guidelines for typical conduct are relaxed or somehow altered. For example, an implicit rule in most high school classrooms is that students sit at their desks while listening to a lecture or while completing an assignment. Yet, consider a student with autism who finds it impossible to sit for any length of time. In response, the typical rules of conduct could be loosened so that the student would be allowed to move around the classroom during lecture and write standing up using a music stand. These types of modified rules and policies can benefit all students, providing environments where learning continues for all while also accounting for multiple intelligences and needs (Gardner, 1999).

“No food or drink” is a general rule in Jack’s sixth-grade classes; however, Jack’s metabolic condition necessitates that he have periodic snack and juice breaks to boost his blood sugar. Jack is allowed to eat and drink while still engaging in instruction, rather than leaving the class and fragmenting his understanding of the curriculum. It is important to consider the explicit and implicit
Provide Personal Assistance  Providing personal assistance to the student is a fourth instructional adaptation. Promoting positive interdependence among classmates is a central tenet in inclusive education. Reciprocal (i.e., mutually beneficial) social and academic interactions must be fostered between students with and without disabilities. As a student with disabilities enters the adult world, school relationships translate to connections with employers and co-workers who typically do not have disabilities. These individuals are the natural support systems in school and community environments and can provide unobtrusive personal assistance to students and adults with disabilities. Personal assistance may be needed on a temporary or ongoing basis in order for some students to learn skills that they are unlikely to learn using direct instruction or other adaptations. For example, a student who has been unsuccessful learning to independently move between high school classes may require the assistance of a peer on a long-term basis. Peers in Jack’s science class were easily taught how to include Jack in selecting key points for their presentation on Mount Vesuvius, how to interpret his eye-point responses or facial expressions, and how to program his iPad so that Jack could utilize simple voice output during the presentation to share information and request questions from the class. The team should clarify the roles of students with and without disabilities when considering the use of personal assistance so that excessive or inappropriate help does not occur.

Use Assistive Technology  Teaching directly or using instructional adaptations may be insufficient during the problem-solving process to address a student’s performance discrepancies. Using AT, which is the third intervention option, may be necessary. This category includes portable objects, equipment, tangible devices, or instructional materials individually designed for the student. These types of adaptations, either commercial or teacher made, can help students compensate for intellectual or physical challenges and encourage students with significant disabilities to more effectively participate in activities (Lancioni, Sigafos, O’Reilly, & Singh, 2012; Langone, Malone, & Kinsley, 1999; Mistrett, Lane, & Ruffino, 2005).

Two categories of AT are particularly useful for students with significant disabilities. Low-tech AT includes picture boards, communication boards, and alternative switches. High-tech AT includes computers, tablets, touchscreens, alternative keyboards, and augmentative and alternative communication (AAC). AAC may be the only way for some students to talk and interact with their typically developing peers and therefore may be the most important adaptations for students with significant communication disabilities. Box 11.1 provides a list of popular and effective AT to help students with significant disabilities gain access to information and achieve goals. In addition, Figure 11.4 provides a checklist that the collaborative team can use to consider and select adaptations for students with severe and multiple disabilities.
Box 11.1. Assistive Technology

Picture communicators can be electronic boards and buttons comprised of pictures in which each button verbally communicates a preprogrammed message.

iPads have incredible assistive technology (AT) capabilities and can be accessed on their own or with a switch. Several iPad applications that benefit students with severe and multiple disabilities include, but are not limited to, simple voice output, communications and feature matching, visual schedules, self-regulation and organization skills, and audio recordings. Several useful iPad app examples follow:

- *Symbol Support*—adds symbols or speech to text to help develop vocabulary and word recognition and improve reading comprehension. Also great for teaching social stories and step-by-step directions.
- *Proloquo2go*—symbol-supported communication that allows the student to speak by tapping buttons with words or phrases. An excellent way to support a student who has difficulty with verbal communication.
- *Me Moves*—plays music and provides changing geometric shapes for the student to trace with his or her fingers. Assists with self-regulation, focus, and calming.
- *iThoughts*—a mind-mapping visual organizer that can assist with understanding classroom concepts, brainstorming, and goal planning.

Switches are beneficial for students with limited body movement. Switches are physically activated devices that connect the student with a piece of electronic AT. An actual switch usually allows the student to look at pictures, words, and so forth until the one he or she wants is found. Selecting the desired piece of data, such as Jack's selection of recorded messages on his iPad, is another way to use the switch.

Alternative keyboards simplify a keyboard for students with severe disabilities who may have difficulty remembering order of keys or are overwhelmed by the amount of keys. Alternative keyboards can be useful to assist students with severe disabilities when using the computer and accessing the Internet.

*Hotkey overlays* allow students with disabilities to enter numbers, words, and phrases by pressing one key on the keyboard.

*Touchscreens* are used by students with severe disabilities to help them use and gain access to information on computers. Touchscreens can either be accessible directly on the monitor of the computer device or can be a supplementary device such as an iPad. They can be assigned to work with pressure or by simply sensing a student's finger on the screen.
General computer/mobile access
- Keyboard using accessibility options
- Word prediction
- Hotkeys/shortcuts
- Text to speech
- Voice recognition software
- Keyguard
- Arm support
- Track ball/track pad/joystick with on-screen keyboard
- Alternate keyboard
- Mouth stick/head mouse with on-screen keyboard
- Switch
- Other:

Communication
- Communication board/book with pictures/objects/letters/words
- Eye gaze board/frame
- Simple voice output device (e.g., iPad, BigMack, Cheap Talk, PictureFrame)
- Voice output device with icon sequencing (e.g., SymbolStix, AlphaTalker II)
- Voice output device with dynamic display (Speaking Dynamically with laptop computer)
- Device with speech synthesis for typing (e.g., Cannon Communicator)
- Other:

Writing
- Word cards/word book/word wall
- Pocket dictionary/thesaurus
- Writing templates
- Electronic/talking electronic dictionary/thesaurus/spell checker
- Word processing with spell checker/grammar checker
- Talking word processing
- Abbreviation/expansion
- Word processing with writing supports
- Multimedia software
- Voice recognition software
- Other:

Reading, studying, and math
Reading
- Standard text
- Predictable books
- Changes in text size, spacing, color, background color
- Book adapted for page turning (e.g., page flippers, three-ring binder)
- Use of pictures/symbols with text
- Talking electronic device/software
- Single-word scanners
- Scanner w/optical character recognition (OCR) and text-to-speech software
- Software to read web sites and e-mails
- Other:


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Learning/Study

- Print or picture schedule
- Low-tech aids to find materials (e.g., index tabs, color-coded folders)
- Highlight text (e.g., markers, highlight tape, ruler)
- Recorded material (e.g., books on tape, taped lectures with number coded index)
- Voice output reminders for assignments, steps of task, and so forth
- Electronic organizers
- Pagers/electronic reminders
- Single-word scanners
- Handheld scanners
- Software for concept development/manipulation of objects—may use alternate input device (e.g., switch)
- Touch window
- Software for organization of ideas and studying
- Palm computers
- Other:

Math

- Abacus/math line
- Enlarged math worksheets
- Low-tech alternatives for answering
- Math smart chart
- Visual manipulatives
- Money calculator and co-inulator
- Tactile/voice output measuring devices
- Talking watches/clocks
- Calculator/calculator with printout
- Calculator with large keys and/or large display
- Talking calculator
- Calculator with special features (e.g., fraction translation)
- On-screen/scanning calculator
- Alternative keyboard
- Software with cuing for math computation (may use adapted input methods)
- Voice recognition software

Recreation and leisure

- Toys adapted with Velcro, magnets, handles, etc.
- Toys adapted for single switch operation
- Adaptive sporting equipment (e.g., lighted or beeping ball)
- Universal cuff/strap to hold crayons, markers, etc.
- Modified utensils (e.g., rubber stamps, brushes, etc.) arm support for drawing/painting
- Electronic aids to control/operate computers/TV/DVD player, etc.
- Software
- Completion of art activities
- Games on the computer/mobile device
- Other:

Activities of daily living

- Nonslip materials to hold things in place
- Universal cuff/strap to hold items in hand
- Color-coded items for easier locating and identifying

(continued)
Adaptive eating utensils (e.g., foam handles, deep sides)
- Adaptive drinking devices (e.g., cup with cut-out rim)
- Adaptive dressing equipment (e.g., button hook, elastic shoelaces, velcro instead of buttons)
- Adaptive devices for hygiene (e.g., adapted toothbrush, raised toilet seat)
- Adaptive bathing devices
- Adaptive equipment for cooking
- Other:

Mobility
- Walker
- Grab bars and rails
- Manual wheelchair including sports chair
- Powered mobility toy (e.g., Cooper Car, GoBot)
- Powered scooter or cart
- Powered wheelchair with joystick or other control
- Adapted vehicle for driving
- Other:

Positioning and seating
- Non-slip surface on chair to prevent slipping (e.g., Dycem)
- Bolster, rolled towel, blocks for feet
- Adapted/alternate chair, sidelyer, stander
- Custom fitted wheelchair or insert
- Other:

Vision
- Eyeglasses
- Optical aids
- Large-print materials
- Auditory materials
- Dictation software (voice input)
- CCTV (closed circuit television)
- Screen magnifier (mounted over screen)
- Screen magnification software
- Screen color contrast
- Screen reader, text reader
- Braille notetaker
- Braille translation software
- Braille embosser
- Enlarged or braille/tactile labels for keyboard
- Alternate keyboard
- Other:

Hearing
- Pen and paper
- Computer/portable word processor
- TDD for telephone access with or without relay
- Signaling device (e.g., flashing light, vibrating pager)
- Closed captioning
- Real-time captioning

(continued)
<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Computer-aided notetaking</td>
</tr>
<tr>
<td>Screen flash for alert signals on computer</td>
</tr>
<tr>
<td>Telephone amplifier</td>
</tr>
<tr>
<td>Personal amplification system/hearing aid</td>
</tr>
<tr>
<td>FM or loop system</td>
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<tr>
<td>Infrared system</td>
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<td>Other:</td>
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**Control of the environment**

<table>
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<th>Feature</th>
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<tbody>
<tr>
<td>Light switch extension</td>
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<tr>
<td>Use of interface and switch to activate electronic appliances or battery-operated devices (e.g., radio, fan, blender)</td>
</tr>
<tr>
<td>Radio/ultrasound to remotely control appliances</td>
</tr>
<tr>
<td>Use of electronic aid to control environment in connection with an augmentative and alternative communication device</td>
</tr>
<tr>
<td>Other:</td>
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**Comments:**
Jack's iPad interfaced to his switch was the most important AT for the science environment. He was able to use his iPad voice output app to ask a peer to be his partner, socialize and present information to the class, and request questions after the presentation. Multiple messages totaling 75 seconds in length were programmed by a peer partner Jack selected and recorded in a young man's voice. These messages included social comments or questions he could activate during in-class work time, such as, "Did you have a good weekend?" or "I agree!" Jack also worked on one of his broad priority goals—increasing self-initiated communication with peers—by using his switch and iPad to initiate conversation rather than waiting for his partner to pose a yes/no question.

After Jack and his partner had created their presentation, his partner also programmed the information Jack wanted to share with the class into the iPad. Sequentially, Jack could use his switch to communicate his part of the presentation and ask the class, "Do you have any questions?"

**Omit Minor Skill or Activity** The decision to omit a minor skill or activity is made only if the student continues to fully participate and has already met or continues to work toward his or her priority goals. For example, Jack used his iPad in math to view the electronic version of the class math modules. His peers were expected to use a standard algorithm to divide multidigit numbers, but Jack's team decided they would omit this skill and he would instead use his adapted calculator on the iPad, which speaks the operations aloud to him in order to perform the operations. Jack therefore worked toward the CCSS of fluently computing with multidigit numbers as well as his priority goal of increasing his use of a computer-generated voice output device.

**Step 4: Implementation and Evaluation**

Direct instruction is necessary and setting meaningful goals is essential whether teaching skills directly or using instructional or device adaptations. Use of an adaptive device serves only to simplify the task or make the task accessible—it does not teach the student. In fact, some have criticized the common practice of substituting adaptive devices for skill development, which sometimes causes passive involvement (Ferguson & Baumgart, 1991). Therefore, instructional programs that delineate systematic cuing and fading strategies should be designed, implemented, and evaluated. Systematic instruction programs provide the entire team with a plan for exactly what to do when teaching a particular skill, what type of prompting to use (e.g., gestural, vocal, model, physical), and a time line to follow for when and how to fade out these prompts so the student can independently complete the skill or task (Browder, 2001; Westling & Fox, 2009). For example, when Jack learned to respond to yes/no questions using the app Proloquo2Go, his team utilized specific verbal and gestural prompts to teach him to eye-point. They then taught Jack's peers to use these prompts to facilitate his interdependence with peers. They monitored his progress and created a plan to fade the frequency of these peer prompts with
the ultimate goal that Jack will no longer require a peer prompt to use eye-point to express his preferences.

Evaluation criteria for determining the effectiveness of adaptive devices should determine whether the adaptation 1) performs its intended functions, 2) is integrated into the instructional sequence, 3) is accompanied by sufficient instruction to learn the adaptation, 4) facilitates independence or interdependence with same-age peers, 5) results in the least intrusive assistance, 6) is attractive and safe, 7) fits in the specific context, 8) results in acceptable rate and quality of performance, and 9) does not interfere with interactions.

A DAY OF ADAPTATIONS FOR JACK

Jack spends his entire day with his peers without disabilities in general education environments, and multiple forms of adaptations support him during each sixth-grade class period. Several examples are provided to demonstrate how these adaptations promote independence and interdependence and allow Jack meaningful participation with his classmates and with the academic curriculum. Because students like Jack are increasingly expected to gain access to and make progress in the general education curriculum (Browder & Spooner, 2006; Vaughn & Swanson, 2015; Wehmeyer, 2006), our examples for developing and implementing adaptations for Jack will also address CCSS (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

Social Studies

A 15-minute student-led activity opens Jack’s sixth-grade social studies class daily. Individuals or pairs of students are assigned to present a current news event from written or electronic media sources. The student(s) presenting the current event must read the article and provide a three-point summary of the primary content. This synopsis then launches an open discussion among class members. Jack uses some of the same instructional adaptations and high-tech devices in this school environment as those identified in his science class. Jack and a partner prepare for their presentation of a current event in the following ways. Jack’s partner reads the article aloud while periodically jotting down main points. The peer then poses yes/no questions to Jack to select the key points to be included in their summary. Three to four statements are recorded on his iPad so that Jack can lead the presentation of the summary. His partner has also selected several points to communicate. Class members are then free to react to the topic, and an informal discussion takes place facilitated by the social studies teacher. When Jack is expected to present alone, the same preparation sequence occurs the night before class at home with his parents. This activity allows Jack to meaningfully engage with his peers and adhere to the sixth-grade CCSS for history and social studies requiring that students “determine the central ideas or information of a primary or secondary source” (National Governors Association Center
for Best Practices & Council of Chief State School Officers, 2010). Examples of the two assistive technology switches that Jack uses are depicted in Figure 11.5.

Language Arts

Jack’s language arts class is reading the novel The Hunger Games (Collins, 2008) and using social media (e.g., Twitter, Facebook, Pinterest) as a platform to engage with the text. Jack reads an entirely adapted version of the story online, which uses Mayer-Johnson picture symbols paired with adapted text to tell the story.

Students work in pairs for this activity and are given the option to post tweets, create a Facebook page, or build a Pinterest board to share a particular character’s thoughts and feelings as the story progresses. Jack and his partner have chosen to create a Pinterest board. After each chapter, they brainstorm new images and captions that represent their chosen character’s feelings and thoughts. Jack always initiates the partnered work by activating a prerecorded message on his iPad, let’s get started! His partner jots down ideas about their character and then reads each aloud, pausing to allow Jack to provide a yes or no facial response or eye-point a yes/no response on his iPad. Once they decide on their images, they work together to Google the best versions and write brief captions for these images before uploading them to their character’s Pinterest board.

This activity allows Jack to meaningfully interact with the reading process and his peers, and it also directly addresses the ELA RL6.3 common core standard “Describe how a particular story’s or drama’s plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

Math

The publisher of the math series provided an electronic version of the math modules that can be viewed on Jack’s iPad. All of the assignments are then
easily modified. Most of the changes require reducing the number of practice problems and allowing multiple-choice options with a scrolling choice format. Jack uses the adapted calculator on the iPad, which speaks its operations. After figuring out the problem, Jack uses his switch to select the correct answer.

Choir

Jack is in the sixth-grade choir with his peers without disabilities. This choir performs quarterly for the entire school and one evening for parents. They also sing for various community organizations around the city. Much time is spent in class preparing for such performances. One of Jack’s many roles in the choir class involves helping the choir review and assess their performance in preparation for various presentations. Jack’s switch is interfaced with his iPad, and his iPad is connected to speakers. Jack is situated with a peer in the front of the class. The students watch him to determine when to begin singing. He then records the entire musical piece on the Voice Recorder app and operates his switch again to play the song back for the choir to hear. Students listen to their performance and fill out a card for the purposes of assessing their sound. The students determine the musical aspects of the song that need improvement (e.g., diction, pitch, rhythmic accuracy, blend, dynamics). Students work to perfect their sound, and this activity is repeated for each musical piece. Jack is not a passive member during this activity; instead, he is a central participant responsible for facilitating the rehearsal.

Art

Students are learning about 20th-century abstract painters and are assigned to small groups to create a mural in the tradition of a famous artist such as Klee, Miro, or Kandinsky. The painter Jackson Pollock served as the inspiration for Jack’s group. Equipped with quarts of paint, paint balls, and paint guns, the group was ready to create. Jack was fitted with a light pointer that could be attached to a hat on his head, wrist, or foot. Jack was one of the group’s designers and directed the location of the paint splashes and paint bombs with the light streaks or pinpoints created by his volitional movements.

Physical Education

Automatic ball pitchers are available at most discount stores for a reasonable cost. These devices are battery powered and switch operated and discharge balls for slow-pitch games. Jack consistently acted as the pitcher during games and batting practice during physical education. The built-in switch of the pitching device was replaced with a larger microswitch called the Big Red, available through AbleNet. The switch was mounted in various locations so that Jack could activate it with his head, hands, or feet, encouraging him to use more active physical movements. Figure 11.5a shows the Big Red switch.
10 THINGS TO REMEMBER WHEN CONSIDERING ADAPTATIONS

Keep the following key considerations in mind when developing and implementing adaptations for students with severe and multiple disabilities.

1. **Teach the skill:** Is an adaptation necessary at all? If a student can learn to engage in an activity without using an adaptation, then the student should be taught to directly engage in that activity.

2. **Consider student strengths:** Focus on what the student can do and what you would like the student to achieve. Always presume competence and hold high expectations for the student.

3. **Determine student preference:** Student preference is an essential consideration for increasing successful implementation of adaptations (Foley & Ferri, 2012; Sax, 2001). Consider what the student enjoys or finds interesting. Would a particular adaptation allow a student to engage in those activities or preferences? Would a particular adaptation allow the student to participate in activities highly valued by family members or peers?

4. **Utilize family input:** Parents and families can offer positive and unique views about their child’s skills, strengths, and talents. Teams should regularly meet with families to problem-solve and create effective adaptations and education plans. In addition, families of students with disabilities can assist their children in learning effective ways of interacting and communicating with students with significant disabilities. For example, families can teach their child to pose yes/no questions or record messages on an iPad.

5. **Create adaptations:** Be creative! There are no right or wrong ways to create adaptations, but it is important to determine who is responsible for creating the adaptation and how and when all the team members will learn how to implement and evaluate the adaptation. Keep in mind that simple is often better. Complex adaptations have a greater likelihood of breakdown and abandonment, which can lead to delays in teaching students the skills that will enhance their participation in school, home, and community environments.

6. **Increase active participation:** Adaptations should increase a student’s participation in an activity, minimize adult assistance, and increase a student’s opportunity to interact with classmates. Adults assigned to support students in general education classrooms sometimes unintentionally inhibit interactions between the student and peers or even between the student and the classroom teacher (Causton-Theoharis, 2009; Causton-Theoharis & Malmgren, 2005; Giangreco, Broer, & Edelman, 1999; Giangreco & Doyle, 2002).

7. **Consider longevity of use:** Consider whether the adaptation will be used in future as well as current environments and whether it will remain age
appropriate. For example, programming Jack’s iPad with conversational messages likely will benefit him in school and community settings for years. The team must also be sure to regularly reevaluate the iPad messages, however, so that they remain age appropriate and on trend.

8. Teach adaptation: It is important to utilize systematic instruction when teaching students to learn appropriate use of adaptations (Downing, 2008; Snell & Brown, 2006; Westling & Fox, 2009). For example, Jack was not simply handed an iPad when he was learning to communicate his preferences using yes/no options on Proloquo2Go. It was necessary to directly teach him to eye-point and activate different apps using his switch.

9. Use peer support: Utilizing peers is one of the best ways to support students with disabilities. Peers can be partners, tutors, role models, and friends. They can best assist students with disabilities to develop age-appropriate social-communication skills as well as academic skills (Carter & Kennedy, 2006; Downing & Peckham-Hardin, 2007). In addition, everyone benefits when peers support peers. For example, when a partner supported Jack during the Mount Vesuvius science project, she was learning the valuable skills of summarizing information, restating questions in a yes/no fashion, communicating with someone who communicates differently than she does, and learning the basics of how to support someone with dignity.

10. Evaluate adaptation: Adaptations must be modified, replaced, or eliminated based on changes in student abilities and/or task requirements. A first attempt at an adaptation is often not the perfect match to address a performance discrepancy. It is necessary to continuously monitor and document whether the adaptation is increasing access to skills, peer interaction, and independence.

CONCLUSION

As it becomes more common for students with severe and multiple disabilities to take their rightful place in schools, communities, and recreation alongside their peers without disabilities, educational teams must work to increase their independence and ease in actively participating in these environments. Instructional adaptations can be the key to minimizing students’ disabilities and maximizing opportunities for interaction, participation, and contribution. Selecting and using the right adaptations can be a complex and delicate endeavor. No formula exists when making such decisions, but a process does exist for developing individual adaptations, with an emphasis on student strengths, knowledge of student goals, and selection of student interventions. This process should be used when selecting and using individualized adaptations. After considering the multitude of preexisting adaptations, teams of professionals may have to design or fashion the adaptive device, taking care to avoid potential negative and unintentional problems. Adaptations should
allow students to learn, discover, contribute to society, and lead more fulfilling lives. Useful adaptations are a result of a thoughtful and dedicated team. Remember that student potential is limited only by the bounds of the team's collective creativity.

**REFLECTION QUESTIONS**

1. What ideologies and beliefs might teachers need to adopt in order to best implement the four-step process for developing and implementing adaptations?
2. What type of collaboration is necessary to implement this adaptation creation process?
3. In what ways did Jack benefit from the adaptations throughout his day?
4. In what ways did Jack's peers benefit?

**CHAPTER ACTIVITY**

1. With a partner or group, consider a target student.
2. Using the student profile and discrepancy analysis templates to guide you, work through the four-step process together to determine effective adaptations for your target student.
3. When finished, reflect on the 10 things to remember in relation to your adaptation decisions.

**REFERENCES**


