Making Presentation Software Accessible to High School Students With Intellectual Disabilities

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The transition of students with moderate and severe intellectual disabilities from inclusive middle schools to high schools may present a challenge to general education teachers. How can teachers use the principles of universal design to facilitate the inclusion of these students in the instructional life of the general education classroom? In particular, what adaptations should teachers make when preparing software-based presentations? How can schools best organize team members to help general education teachers prepare necessary instructional materials and adaptations?

As students with moderate and severe intellectual disabilities transition from inclusive elementary and middle schools to high schools, they deserve similar opportunities for inclusive educational experiences at this next level—namely to participate in general education classes and other activities (e.g., co-curricular) with their classmates without disabilities. Yet at the high school level it is more common for students with moderate and severe intellectual disabilities to be placed in special education classes, often for the first time in their educational careers (Carter, Hughes, Guth, & Copeland, 2005; Sandstrom & Zakriski, 2004). Typically, this shift has little to do with individual student characteristics, their preferences, friendship networks, or perceived abilities, as each of these areas remain substantially the same in the few summer months between middle and high school. It is more likely that the difference lies in the context, traditions, and expectations of high school.

In our work with high school teachers, some express their own lack of preparation for and understanding of inclusive education as a barrier to inclusive placements; others have concerns about the cognitive discrepancy between students with moderate and severe intellectual disabilities and students without disabilities. Still other teachers simply have had insufficient opportunities to collaborate with special education colleagues in facilitating inclusive experiences at the high school level. In order for inclusive education to make sense to high school teachers, they must have a clear understanding of how the needs of the student with disabilities can be addressed within the context of the general education classroom (Fisher, Pumpian, & Sax, 1999; Jorgensen, Fisher, & Tashie, 2007). Special education teachers can play a critical role in supporting their general education colleagues along this journey.

Special educators can support their general education colleagues in a variety of ways to increase access for students with moderate and severe intellectual disabilities to general education curriculum and instruction. These strategies we describe in this article respond to the specific challenges of high school teachers (both special educators and general educators), and are currently used in the Saint Michael's College teacher preparation program as a way to prepare teacher-students to meet the diverse learning abilities of their future high school students.

The suggestions in this article are not exclusive to high school situations; they could easily be used at any level where presentation software is used to

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deliver information. We focus on secondary settings because it is our experience that high school teachers tend to use this medium more frequently than elementary and middle school teachers. Teachers at any level can expand the impact of their work by incorporating principles of universal design from the beginning of their instructional planning.

Organizing Student Information

In order for general education teachers to engage their students with moderate and severe intellectual disabilities in the instructional life of the classroom, they need to know about each student's instructional goals, instructional strategies that have been effective in the past, and necessary accommodations or adaptations. A Student Information Form (Figure 1) is one way for special educators to organize this information for classroom teachers. The special and general education teachers can discuss the information to ensure they have a shared understanding of the student's learning priorities as they relate to specific content areas, and problem-solve how to leverage the student's strengths and needs within classroom instruction. This student-specific information is used by the classroom teacher when designing instructional materials for the class. Having the information in advance allows the teacher to be more deliberate in the initial design work, rather than having to go back to change or adapt portions of the materials as an afterthought.

Teachers at any level can expand the impact of their work by incorporating principles of universal design.

Strategies for Creating Universally Designed Slide Shows

Many high school teachers use presentation software such as PowerPoint®, Impress®, or Keynote® to enhance or supplement instruction. Presentation software allows the teacher to combine pictures, sound, videos, and the written word to deliver instructional content to students with a variety of learning characteristics and styles (see box, "Tips for Creating an Effective Slide Show"). Teachers can use principles of universal design to develop slide shows

Figure 1. Student Information Form

Student Information Form

Student: _____ Grade: _____

Classroom Teacher: _____ Special Educator: _____

1. What are his/her assets that should be leveraged during instruction?
2. How does this student learn best?
   Visual Auditory Kinesthetic Musical Hands On
   Verbal/Linguistic Experiences
3. Reading Level _____ Math Level ____
4. What instructional strategies have worked well in the past?

Instructional Strategies	Has Worked	Has Not Worked	Not Yet Attempted
Adjusted reading level			
Picture reading			
Supported note-taking			
Supported slide shows			
Graphic organizers			
Flash cards			
Technology: *Word processing* *Games* *Inspiration®* *Kidspiration®* *Word Q®* OTHER:			
Checklists			
Agendas			
Direct instruction			
Partial participation			
Repeated practice			
Other:			

5. What are two IEP short-term objectives that the student will be pursuing this month?

   _____

   _____
6. What are the adaptations or accommodations that are needed per the IEP?
7. Our regularly scheduled planning meeting will be: _____
8. In-class support provided by the special education teacher:
   ___ Co-teaching
   ___ Group support
   ___ Support to individual students
   ___ Creation of adaptations and accommodations
   ___ Other: _____

accessible by a wide range of students. *Universal design* refers to the materials and activities that make learning goals achievable by individuals with wide differences in their abilities to see, hear, speak, move, read, write, understand English, attend, organize, engage, and remember. *Universal design for learning* is achieved by means of flexible curricular materials and activities that provide a variety of instructional access points for students in heterogeneous classrooms. This includes students with differing abilities, interests, and background knowledge or experience with the subject matter. These alternatives are built into the initial instructional design and operating systems of educational materials, not added on after the fact.

Increasingly, teachers are incorporating these principles into the design of their classrooms, curricula, and instruction as a means of meeting the needs of an increasingly diverse student body (Rose, Meyer, & Hitchcock, 2005). Burgstahler (2008) suggests several principles to be used when designing instruction within the universal design framework (see box, "Principles of Universal Design").

However, for some high school teachers incorporating principles of universal design is a new experience—and others who are experienced with universal design may not have had opportunities to consider how to facilitate mastery of content-area knowledge for students with moderate or severe intellectual disabilities. The following strategies incorporate the principles of universal design to extend the use of presentation software to facilitate the inclusion of students with moderate and severe intellectual disabilities in the instructional life of the classroom.

Use Different Printing Options

The various presentation software programs offer different printing options (i.e., full page, several slides per page, notes, slides with blank lines to the right of each slide, graphic organizers). General and special education teachers can work together to decide which option is the most beneficial for the student with moderate or severe intellectual disabilities. The teacher can provide a hard copy of the slide show to other team members (e.g., special educator, family, peers, speech language pathologist) so that the content can be pretaught or reinforced. This strategy provides the student with moderate or severe intellectual disabilities a way to focus on the content of the instruction being offered, and offers opportunities for others to teach and reinforce aspects of the content. This support from other team members increases the likelihood of the student acquiring content knowledge.

Tips for Creating an Effective Slide Show

- Use high-quality images
- Minimize written text— remember the "6 × 6" rule: no more than 6 words per line and 6 lines per slide
- Stick to the "big ideas"; limit the number of slides to key points
- Include brief audio and video clips when appropriate
- Be deliberate when using animation features; do not overuse
- Use contrasting colors carefully (dark text on a light background is best)

Prioritize and Code the Content

The priority slides for "Sara," a student with Down syndrome and moderate intellectual disabilities, are always designated with a specific symbol (i.e., a star). Although exposed to the entire PowerPoint® presentation during whole-class instruction, Sara focuses most intently on the slides with the symbol. This focus can be reinforced by the teacher asking Sara questions related to the targeted slides, and by others (e.g., peer tutors, special educator, parents) helping teach and reinforce the content of those slides.

Having all of the content available provides the opportunity for the student with moderate or severe intellectual disabilities to surprise team members by learning content beyond initial expectations. Such an approach aligns with Donnellan's (1984) *least danger-*

Principles of Universal Design

- *Equitable Use.* People with diverse abilities and background knowledge can use the same materials. For example, a slide show presentation with embedded text-to-speech applications and linked to a text-decoding Web site incorporates features supporting students with moderate or severe disabilities, English Language Learners, auditory learners, and students who are blind or visually impaired.
- *Flexibility in Use.* The design of the instructional materials and instructional space invites participation by students with varying preferences and abilities. For example, a slide show that is used for multiple purposes might include formal presentation, vocabulary access, games, and assessment.
- *Simple and Intuitive.* The design is easy to use by learners with a range of interests and experiences. For example, a teacher might design all slide shows with the same icons for slide advancement, audio output, and/or hyperlinks.
- *Perceptible Information.* The design communicates information effectively (see box, "Tips for Creating an Effective Slide Show").
- *Size and Space for Approach and Use.* The physical arrangement permits use by all students. For example, all computers in the classroom have adapted mouse switches, all electronics are wired to operate with a wireless remote, and tables and desks are wheelchair accessible.

Figure 2. Hyperlink

ous assumption: "in the absence of conclusive data educational decisions should be based on the assumption which, if incorrect, will have the least dangerous effect on the student" (p. 142). We have had many experiences of such surprise!

Shorten the Slide Show

During a comparable amount of time, students with moderate or severe intellectual disabilities may learn less of the general education curriculum content or fewer vocabulary terms than their classmates without disabilities. The classroom teacher can provide a shortened version of the slide show for the student with moderate or severe intellectual disabilities that focuses on the major instructional points. For example, rather than being responsible for the content on all 15 slides, Sara is expected to learn three key unit-related concepts as identified by the classroom teacher.

Figure 3. Fill-in-the-Blank Slide Show

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Enrich or Expand the Slide Show

Teachers can enrich slide shows by adding hyperlinks, portions of text (i.e., words or phrases) that connect, when activated, to a preselected Web site. Typically a hyperlink icon is located on the presentation software toolbar (see Figure 2).

Hyperlinks offer students with and without disabilities additional sources of information to deepen or extend their knowledge. The general or special education teacher should choose Web sites with special attention to reading level, picture quality, and audio output. It is not unusual for students with moderate and severe intellectual disabilities to have gaps in background knowledge and experiences. For example, upon entering a unit on ancient Egypt, Sara was the only student in the class with limited prior knowledge about mummies. The teacher added hyperlinks in the PowerPoint® slide show to address this gap in Sara's content knowledge. Sara needed the content contained in the links to fill in knowledge gaps; however, students without disabilities also had the opportunity to explore that area more deeply.

Create a Supported or Fill-in-the-Blank Slide Show

A fill-in-the-blanks slide show is another way students can learn or study content. A "word bank" of words and pictures next to individual slides pro-

vides a visual cue (see Figure 3). Offering only one word option per slide incorporates errorless learning; the student can only make a correct response, ensuring that she practices the correct information. This is particularly helpful for students with moderate or severe intellectual disabilities as they may learn at a slower rate than their peers; not encouraging the student to practice errors precludes additional delay in content mastery.

Use Audio Output Options

High school students with moderate or severe intellectual disabilities may be nonreaders or read at a significantly lower level than their same-age classmates without disabilities. One way to minimize the impact of this discrepancy while creating ways for the student to acquire rich and interesting content is to utilize automated text-to-speech audio output options. Text-to-speech output allows students increased independence and another means of studying and preparing for class.

Many popular presentation software programs offer text-to-speech options; simply search the "Help" menu and experiment. If the program you are using does not offer this option, work with your media specialist or librarian to identify text-to-speech programs that align with the teaching needs of the general education teacher and the technology systems used in the school (see box, "Additional Resources").

You can also insert your own narration with a hyperlink and an icon on the presentation slides. This requires a speech-to-text program (see box, "Additional Resources") as opposed to text-to-speech. Speech-to-text programs allow the general education teacher to personalize slide show clips as appropriate. General educators may be familiar with and use this technology to support students without disabilities who are auditory learners or English language learners, but may not have considered potential applications for students with moderate or severe intellectual disabilities.

Additional Resources

Text-to-Speech Programs

Many off-the-shelf programs such as Microsoft Word®, Adobe Acrobat Reader®, and Kidspiration® and Inspiration®, offer text-to-speech options. For add-on programs, explore Naturalreader.com, WordQ (www.wordq.com), SpeakQ (www.speakq.com), and Dragon Naturally Speaking (www.naunce.com).

Speech-to-Text Programs

Kidspiration® and Inspiration® include speech-to-text option tools. For add-on programs, explore Dragon Naturally Speaking (www.naunce.com) and SpeakQ (www.speakq.com)

Online Flash Card Programs

www.flashcardmachine.com (membership fee)

www.flashcardexchange.com (membership fee)

www.proprofs.com/flashcards (free; requires registration)

http://quizlet.com (free; requires registration)

www.scholastic.com/kids/homework/flashcards.htm (free)

www.studystack.com (free); see also StudyStack's list of online software at http://www.studystack.com/FlashCardLinks.jsp

Online Picture Dictionaries

The Visual Dictionary (www.infovisual.info)

Internet Picture Dictionary (www.pdictionary.com)

Also see

Center for Applied Special Technology (CAST), *Universal Design for Learning* (http://www.cast.org/research/udl/index.html)

National Early Childhood Technical Assistance Center (NECTAC), *Universal Design for Learning and Assistive Technology* (http://www.nectac.org/topics/atech/udl.asp#Resources)

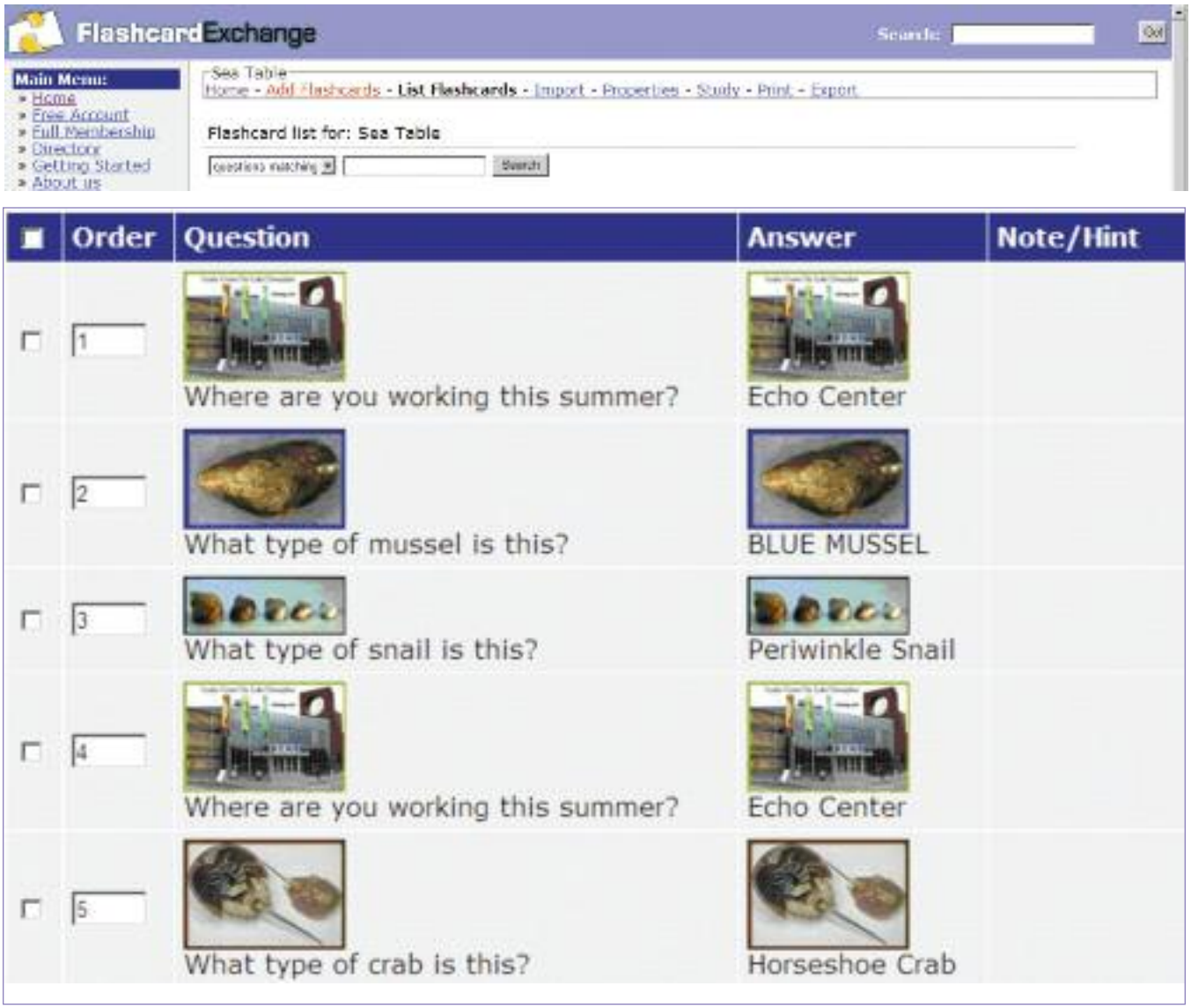
U.S. Department of Education Office of Special Education Programs (OSEP), *Tool Kit on Universal Design for Learning* (http://www.osepideasthatwork.org/UDL/index.asp)

Embed Content-Specific Vocabulary

Every curriculum content area has associated vocabulary. For example, it is more likely that students will encounter the term *cell* in a biology class and the term *revolution* in a history class. In a sense, vocabulary is the intellectual capital within classroom discussions, and this capital is exchanged when the teacher embeds and uses it throughout the curriculum and instruction (e.g., presentation software, unit-specific projects). For many students without disabilities the acquisition of new vocabulary is a result of their ability to (a) make connections within the context of instruction, (b) derive meaning from cues within the sentence or paragraph, (c) ask a peer or teacher, or (d) use a dictionary. Students with moderate or severe intellectual disabilities often need others to provide structured ways (e.g., preteaching, use of pictures) to acquire at least some of the new vocabulary/capital that will add to their understanding of the topic.

One way to support the student with moderate or severe intellectual disabilities in learning new vocabulary is for a member of the team (e.g., classroom teacher, special educator, speech/language pathologist) to take vocabulary terms from the slide show and develop a variety of activities to provide instruction and practice in acquisition of the terms. For example,

Figure 4. Electronic Flash Cards



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team members can provide instruction and practice with content-related vocabulary by linking the vocabulary from the slide show to an online flash card program.

Using an online flash card program (see box, "Additional Resources") can help students acquire knowledge-level material. On one side of the virtual flash card, enter the vocabulary term and a picture from the slide show; on the other side type in the definition and picture (see Figure 4). You can find appropriate pictures to include on the flash cards from one of the many online picture dictionaries (see box, "Additional Resources"). Online flash card programs also make it easy to build in repetition by duplicating cards (see Figure 4, slides 1 and 4). Generally speaking, online flash card programs link vocabulary terms with pictures and games very well. The student with moderate or severe intellectual disabilities can be paired with classmates to play the games, thereby benefiting both students. Such pairings offer the student with disabilities the opportunity for additional practice with engaging in reciprocal interactions with peers, participation in shared experiences, and content review.

Essential ideas and concepts are fodder for interesting conversations and connections that are too often not considered valuable for students with moderate or severe intellectual disabilities.

Printing the flash cards makes them available for use and review throughout the day (e.g., during speech therapy, reading support, study hall, homework). Facilitating access for parents and other team members to the online flash card site minimizes the need to communicate with the rest of the team about academic content details, while concurrently involving them in providing supplemental instruction or tutoring. This can be a time saver for high school teachers, allowing other team members to support the student as well. It is important to note that everyone has a different level of skill with the use of technology and we all have our individual preferences. When selecting a flash card program with appropriate features for the student, be certain that other team members will be able to use or learn to use the program as well.

Facilitating access for parents and other team members to the online flash card site minimizes the need to communicate with the rest of the team about academic content details, while concurrently involving them in providing supplemental instruction or tutoring.

These vocabulary activities help the student with disabilities to move beyond procedural knowledge to conceptual knowledge. Combining smaller pieces of information with larger ones teaches ideas and concepts—contributing to the life of the mind. Essential ideas and concepts are fodder for interesting conversations and connections that are too often not considered valuable for students with moderate or severe intellectual disabilities. Yet the connections around interesting ideas and experiences can create bridges between people.

Final Thoughts

Although developing slide shows and vocabulary materials for every unit of instruction can be time consuming, there are some ways others can support the general education teacher with this work. For example, at the beginning of the academic semester, the general education teacher could prepare a slide show for the first instructional unit or two, as a model. The special educator then would coordinate with other team members (e.g., parents, speech language pathologist, reading teacher) or volunteers (e.g., other high school students, teacher education students from a local teacher education program) to help create slide shows for future units of instruction. The classroom teacher would be responsible for topics of instruction and key vocabulary terms, and review and edit draft slide shows created by others. (Edits might include adding favorite pictures or quotes, correcting or deleting hyperlinks and animation, etc.) Such a collaborative approach would build on itself and become more efficient over time.

Inclusive classrooms offer high school special educators and general education teachers opportunities to engage in an exciting level of professional problem solving. Figuring out ways in which adults and students can work together to offer increasing numbers of high school youth (including those with moderate or severe intellectual disabilities) opportunities to access rich and interesting curriculum is, after all, a foundation of teaching. Content knowledge, language, and content-specific vocabulary become the fodder for meaningful conversations both now and in the future. In her high school graduation speech, the late Erin McKenzie said, "I love Shakespeare, theatre, and Drama Club" (McKenzie, 2004). Historically, this level of academic enrichment simply would not have been considered for students like Erin because she had Down syndrome. Our hope is that increasing numbers of teachers will begin to see the connections between their content areas and improved quality of life for all students, including those with moderate and severe intellectual disabilities.

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