

Effective Classroom Adaptations for Students with Visual Impairments

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- Basic traffic safety
- Playground boundaries
- Cafeteria use
- Computer use in library or media center
- “Readable” maps and charts
- Verbal (auditory) alternatives
- Emergency procedures

How does your school or classroom measure up in these categories when it comes to making adaptations for young people with visual impairments? You need to answer many questions: Can everybody exit the building quickly in the event of an emergency? Can all students locate and use water fountains? How about items on bookshelves in the classroom or library? Or special learning centers in the classroom?

We can appropriately teach students with visual impairments in general education settings. But we must be sure that we are informed about students' visual abilities and their affect on learning and integration in the general classroom environment.

This article discusses strategies for including students with visual impairments into general education settings. The article provides a starting point from which general educators can begin to learn about visual impairments and build skills that will benefit all their students (see box, “Commonly Used Terms”).

Categories of Visual Impairments

Categories of visual impairments reflect more than just visual acuity. Students' ability to use vision, as well as how much they use other senses for learn-

ing, are aspects of each category (Bishop, 1996; Turnbull, Turnbull, Shank, Smith, & Leal, 2002). The terms *low vision*, *functionally blind*, and *blind* are often used to describe and categorize levels of vision. Each category is considered in terms of the degree of acuity and its implications for students' learning.

- **Low Vision.** Generally, students with low vision are able to learn using their visual sense; however, they may need to have print magnified, contrast enhanced, or type font or size changed (Turnbull et al., 2002). Students in this category characteristically work more slowly and experience difficulty working with details (Colenbrander in Barraga & Erin, 1992).
- **Functional Blindness.** People with functional blindness typically use a combination of modalities to function within their surroundings (Turnbull et al., 2002). Students in this category generally read and write using Braille. Some functionally blind individuals have sufficient vision to allow them to move around the classroom safely. Others, however, may require considerable accommodations to do so.
- **Blindness.** Near blindness and total blindness are included in this category. Near blindness occurs when visual acuity is reduced so greatly that learning takes place using data from other senses most of the time (Colenbrander in Barraga & Erin, 1992). Students with total blindness receive no stimuli from their visual channel. They depend entirely on input from other senses.

Incidental Learning

Students with visual impairments lack opportunities for incidental learning that occur for their sighted peers almost constantly (Hatlen & Curry, 1987). Without such opportunities, associating words with elements of the environment is difficult. Thus, it is important that such associations be supplemented with input from other senses and through alternative activities.

The limited nature of visual associations for students with visual impairments has classroom implications. Absence of or reduced visual cues, such as a schedule written on the chalkboard or seeing the clock, can prevent these students from following classroom procedures or anticipating coming events. Students need opportunities to become acquainted with their classmates. Because students with visual impairments may not readily associate names and faces through incidental classroom experiences, teachers need to design appropriate experiences to help build relationships among all students in a class. Physical orientation of students to classroom routines or other events that take place during the day is important and must occur as soon as possible once the student is assigned to the classroom.

Orientation and Movement

Students with visual impairments should move around the classroom or other areas of the school just as their sighted peers do. Free movement around school is an essential part of successful school experiences. Orientation and mobility training helps stu-

Commonly Used Terms

The following terms are frequently used by professionals who work with students who have visual impairments. Understanding these terms will allow general education teachers to communicate with other support personnel more effectively.

Visual Acuity. Visual acuity is a term used to refer to how well a person sees from specified distances. For example, a measurement of 20/20 denotes normal vision—objects seen from a distance of 20 feet can be seen with accuracy expected for that distance. If visual acuity is measured at 20/100, objects seen by the individual with typical vision at 100 feet must be viewed at 20 feet by the person with impaired vision.

Visual Impairment. Conditions of the eye or visual system that result in less than normal vision are visual impairments (Barraga & Erin, 1992). Such impairments can include reduced visual acuity, obstructed or narrowed field of vision, or failure of visual stimuli to be sent to or processed by the brain. The condition may or may not be correctable.

Visual Perception. Visual perception is the ability to gain meaning from stimuli received visually (Barraga & Erin, 1992). Students with visual impairments can have visual perception even if their visual acuity is low. Visual perception can be enhanced through training.

Visual Functioning. The extent to which vision is used is called visual functioning. Visual functioning skills allow people with visual impairments to gather information from their experiences, which they use to interpret their immediate surroundings and to apply in other circumstances. According to Corn (1989), visual functioning skills help students gain information from directed, as well as incidental, experiences and aid them in planning and carrying out tasks.

Students whose visual acuity is poor can learn to use their vision efficiently to meaningfully interpret visual images (Heward, 2000). Many students with impaired acuity can still use their vision for learning. In fact, people with lower acuity who have learned to use their vision may actually function better than people with higher acuity who have not developed skills for using their vision. Visual functioning can depend on students' experiences using their vision, training to use their vision, and their motivation to function visually.



Most students with visual impairments have some usable vision.

Designing Effective Learning Environments Through Collaboration with Vision Specialists

Students with visual impairments placed in general education classes usually get support services from a vision specialist (Heward, 2000). Such topics as learning through other senses, instructional and curricular adaptations, and appropriate resources and materials are the domain of vision specialists. General educators will find these colleagues a valuable source of information and assistance that will help them capitalize on students' abilities (see Figure 2 on page 71 for a checklist of classroom materials and strategies for teachers).

General education teachers serving students with visual impairments must work in collaboration with vision specialists. Vision specialists should be a part of the team of professionals work-

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dents accomplish this goal. Koenig (1996) stated that such training “promotes safe, efficient, graceful, and independent movement through any environment, indoor and outdoor, familiar and unfamiliar” (p. 260). Orientation and mobility skills help people know where they are in relation to their surroundings and how to safely navigate within their environment (Turnbull et al., 2002).

Relevant skills for the school setting include knowing where landmarks are throughout the school setting; being familiar with the layout of classrooms and common areas such as the library, gym, and cafeteria; and knowing where exits, restrooms, the main office, and other relevant areas are. Students need

training in the school's emergency procedures, such as fire, tornado, or earthquake drills. Orientation and mobility skills are also important in outdoor areas such as playgrounds and bus loading zones (see Figure 1 on page 70 for a checklist of skills for classroom teachers).

Different types of mobility systems are available, including sighted guides, canes, guide dogs, and electronic devices (Hill & Snook-Hill, 1996). Orientation and mobility specialists can help determine the best system to use for individual students; as well, the specialists can provide information about the preferred system and any training general education teachers may need.

Figure 1. Checklist for Outdoor and Indoor Orientation and Mobility Adaptations

Outdoor Orientation and Mobility	Yes	N/A	More Information
At bus loading zones: Student knows			
Basic traffic safety			
Location of zone in relation to building entrance			
Procedure for getting on and off the bus			
On the playground: Student knows			
Configuration of playground			
Location of boundaries of the playground in relation to the classroom, building, streets, etc.			
Location and nature of playground equipment			
Safety rules of using playground equipment			
Location and use of adapted equipment			
In the community: Student knows			
Procedures for riding the bus to and from school			
Indoor Orientation and Mobility	Yes	N/A	More Information
In the building: Student knows locations of			
Main office			
Restrooms			
Clinic			
Exits and entrances (in relation to where the student is at different times—including emergency procedures)			
Classrooms			
Media Center			
Cafeteria			
Potential hazards			
In the classroom: Arrangement is easy to navigate			
Pathways are unobstructed			
Books, bookbags, and other personal items are properly stored			
Areas often used by students (i.e., centers, places to turn in work, exits) are readily accessible			
Familiarize students with configuration of desks; repeat or inform each time configuration changes			
Student knows location of			
Storage areas			
Sink and water fountain			
Centers or other work stations			
In the Media Center: Student knows location of			
Circulation desk			
Bookshelves			
Tables or reading areas			
Adapted computers and printers			
Student knows procedures for			
Obtaining assistance			
Checking out and returning materials			
In the cafeteria: Student knows location of			
Serving line			
Cashier			
Tables			
Disposal areas			
Student knows procedures for			
Going through the serving line, requesting, and obtaining food			
Disposing of garbage			
Leaving the cafeteria			

Figure 2. Checklist for Classroom Strategies and Adaptations

Classroom Supplies and Equipment	Yes	N/A	More Information
Raised-line or bold-line paper, templates, and/or writing guides			
Soft lead pencils			
Felt-tip pens (various widths; high-contrast colors)			
Supplementary light source (e.g., desk lamp)			
Braille writer; slate and stylus			
Magnification device			
Book stand			
Cassette tape recorder/player			
Sun visor or light shield to reduce glare			
Large print reading materials (preprinted or produced using computer technology)			
Physical education equipment with auditory signals (e.g., beep balls)			
Safety Considerations	Yes	N/A	More Information
Evaluate environment for potential hazard areas (e.g., stairs, playground structures, dimly lit areas)			
Ensure that doors and storage areas are completely open or completely closed at all times			
Ensure that student knows routines for fire drills and other emergency procedures			
Instructional Strategies	Yes	N/A	More Information
Have student sit closer to see board, videos, demonstrations, etc.			
Give student copies of teacher notes			
Read notes aloud while writing them on board			
Provide audio tapes of reading material			
Allow student to turn in taped rather than written responses			
Enlarge books, worksheets, etc.			
Provide opportunities for hands-on learning			
Additional Curriculum Areas	Yes	N/A	More Information
Daily living			
Listening skills			
Keyboarding and computer skills			
Orientation and mobility			
Social skills			
Human growth and development			
Braille literacy			
Use of vision			
Collaborating with Other Professionals	Yes	N/A	More Information
Meet and know schedules of specialists who might work with student (e.g., orientation and mobility, itinerant vision educator, occupational therapist, etc.)			
Learn how and when student uses sighted guide, long cane, etc. for travel			
Learn about magnification devices, brailers, and other equipment available to and used by student			
Learn about student's strengths/weaknesses and academic needs and develop appropriate strategies			
Become familiar with individualized education programs (IEP) goals and objectives and other services specified to be provided			

ing to ensure that students are receiving appropriate services and accommodations. Vision specialists can help determine what goals and related services should be included on the individualized education program (IEP) of the students, as well as what types of accommodations are needed in the classroom. General educators who consult regularly with vision specialists are better able to fashion learning experiences appropriate for their students.

Tactile and Kinesthetic Learning

Students with visual impairments use tactile and kinesthetic input to learn about their environments. Such input should not be thought of as “lesser senses” to use in the absence of vision, but as *another system through which learning takes place* (Klatzy & Lederman, 1988). Tactile and kinesthetic input can provide students with information about objects they come in contact with and use.

Any visual materials used in classrooms need to be adapted for use by students who do not have the visual skills required for the task. Charts, models, maps, and graphs will have greater educational value for students with visual impairments if they can be “read” using the sense of touch. For example, outlining map boundaries with string enables students with visual impairments to use their sense of touch to read maps.

Whenever teachers use manipulatives, models, or other equipment, students with visual impairments need the opportunity to use their tactile and kinesthetic senses to become familiar with the objects to benefit from their use in lessons. Teachers should introduce students with visual impairments to materials and equipment used in

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activities such as science experiments *before* the activity. If students have the opportunity to learn about the materials or equipment before the activity begins, they will be more able to concentrate on the concept being taught rather than on what equipment they are using. Toward this end, a specialist will assist students and general classroom teachers with adaptations as needed.

Auditory Learning and Accommodations

Auditory input provides another way students can gain information. Teachers should not assume, however, that students will understand verbal input in

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the same way and at the same depth as other students understand visual input. Auditory language triggers the creation of mental images that correspond with words. Images are recalled to assist students in comprehending verbal language (Barraga & Erin, 1992). A student with visual impairments is likely to have fewer and less detailed mental images to correspond with verbal language. Such images may differ according to a student’s individual experiences and verbal input he or she has received from others (Whitmore & Maker, 1985)

General education teachers should observe and interact with students with visual impairments in an effort to determine whether individual students understand verbal input. The teacher must check for comprehension during class discussions and when giving directions. If students are having difficulty understanding what the teacher says, the teacher may need to clarify or

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MONEY MANAGEMENT.**

expand on their background knowledge or vocabulary.

Organizations providing services for people with visual impairments offer audiotaped textbooks. Classmates can be designated as notetakers for students with visual impairments. Class notes can then be audiotaped or transcribed using an enlarged font or Braille.

General education teachers may also develop verbal or other auditory cues as signals for attending to important information or particular events. Teaching listening skills is also important. Efficient listening is crucial to classroom success for students with visual impairments. Improved listening skills help students with visual impairments increase their spoken and written communication and reading skills (Heward, 2000). Teachers can consult vision specialists to determine appropriate auditory accommodations for each student.

Visual Learning and Accommodations

Most students with visual impairments have some usable vision. Their visual learning can become more efficient if they can enhance their skill to use their vision through training or the use of assistive devices. Observe students to determine that they have visual skills sufficient for locating and tracking visual materials. Vision specialists can offer assistance in developing students’ visual skills and in making accommodations necessary for helping students use their vision in productive ways. Such services include making maps, adapting reading materials, and assisting in general accommodations.

Many options are available for teachers selecting reading and writing materi-

als for students with visual impairments. According to their needs and preferences, students may use printed or Braille materials. Printed materials should be clear and be printed using an easily readable font. Providing an easel to hold reading materials can help students with visual impairments do close work more easily (Barraga & Erin, 1992). Black felt-tip pens and soft lead pencils are useful writing utensils for students with visual impairments because of the increased amount of contrast they create against white writing paper (Koenig, 1996). An extra light source at the student's work area can be helpful for some students (Heward, 2000). If a student can benefit from an additional light, the light's placement should be determined in collaboration with the vision specialist.

Some simple strategies for using printed materials can help students with visual impairments learn visually without requiring huge adjustments to the classroom environment. Simply holding books or other materials closer is enough to help some students with visual impairments (Heward, 2000). Using magnification devices or large-print materials are two accommodations that are often implemented in the classroom (Barraga & Erin, 1992). Such equipment and materials are available for students who need them.

Here are other considerations for general education teachers to remember during lessons and when preparing materials for use in the classroom (see Figure 2).

- The student's position in the classroom in relation to visual presentations should allow for an unobstructed view. If necessary, allow the student to move to a position with a better vantage point when visual materials are being used.
- Information written on the chalkboard should be large. Dry erase boards are good alternatives to regular chalkboards. The bright background strongly contrasts with the colors (especially black) used on them.
- All visual aids should have clear, sharp images. Materials with high contrast are easier for students with



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visual impairments. For example, handouts should have very dark black or navy blue print on bright, white paper.

Technological Adaptations

Technological advances have created many products that are advantageous for students with visual impairments, both for input and output of information. Equipment is available that helps students with visual impairments by "reading" printed material, providing braille printouts of what is seen on the computer monitor, and converting braille to print. Some word processors print in traditional text or Braille.

Choosing appropriate technological adaptations for students with visual impairments entails numerous and complex considerations that are beyond the scope of this article. Teachers and school teams should make such decisions in consultation with the vision specialist, according to each students' needs.

Curricular Considerations

The academic curriculum appropriate for students with visual impairments is determined by their cognitive abilities. The goals and objectives set for students *without* visual impairments do not need to be changed for a student due solely to a vision problem, though

the methods for accomplishing the goals may be different.

Many students with visual impairments, however, require instruction in additional curricular areas. Teachers and schools frequently need to emphasize orientation and mobility training, daily living skills, and social skills for students with visual impairments. Again, the vision specialist should be actively involved in curricular decisions.

Orientation and Mobility. As mentioned earlier, students with visual impairments need to learn skills that will enable them to travel from place to place safely. An orientation and mobility specialist should provide instruction for students in this area and can provide information for classroom teachers about the skills being taught.

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Daily Living. Lack of opportunities for incidental learning may make it necessary for students with visual impairments to receive specific instruction in daily living skills. Barraga and Erin (1992) mentioned some daily living skills that are important to consider. Self-care skills that need to be assessed to determine the need for instruction include dressing, taking care of clothing, eating, and preparing food. Teachers often need to provide direct instruction in skills such as housecleaning, safety, home maintenance, and money management. Depending on the nature of the skills, they may be taught by a teacher certified in vision, an occupational therapist, or an orientation-and-mobility specialist. Vocational rehabilitation counselors may be involved in planning and providing transition services for students seeking postsecondary education or training or preparing to enter the work force (Torres & Corn, 1990).

Social Skills. Research has indicated that students with visual impairments are behind their peers without impairments in social skills development (Erin, Dignan, & Brown, 1991). Without the benefit of certain visual cues, some students may not have learned behavior appropriate in social situations. Students with visual impairments may need to be taught how to extend their hand to shake hands or how to use their hands to gesture appropriately when talking. Conversational skills, such as making (or simulating) eye contact or how to orient themselves to others spatially (Barraga & Erin, 1992), are important for successfully integrating students

with visual impairments into general education settings.

Final Thoughts

As inclusive programs for students with disabilities increase in number, general education teachers will need to understand the effect that disabilities have on students. Such understanding will allow them to make appropriate accommodations and adaptations to design inclusive educations for students with disabilities.

Visual impairments affect students in a variety of ways. General education teachers who are aware of the implications of visual impairments on students' learning will be able to provide their students with educational opportunities that will lead to successful academic and social experiences.

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