CLASSROOM STRATEGIES TO USE WITH STUDENTS FOLLOWING TRAUMATIC BRAIN INJURIES: READING, MATH, WRITING, AND BEHAVIOR

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ABSTRACT

A Traumatic Brain Injury (TBI) changes cognition and behavior in students. Their learning needs are different from students with other exceptionalities. General and special education teachers can use specific strategies based on learning style, along with certain resources, with students who have experienced a TBI to promote learning in reading, writing and math. The typical Behavior Improvement Plan of Antecedent, Behavior, Consequences does not work with a child after a TBI. Instead, a Behavior Improvement Plan should be developed based on the student's learning style after the injury, incorporating his or her physical and cognitive capabilities.

Differential instruction is a buzzword for No Child Left Behind schools. Theroux (2004) stated,

> Differentiating instruction means creating multiple paths so that students of different abilities, interest or learning needs experience equally appropriate ways to absorb, use, develop and present concepts as a part of the daily learning process. It allows students to take greater responsibility and ownership for their own learning, and provides opportunities for peer teaching and cooperative learning. (p. 1)

This is good for students with TBI. Levine says,

> . . . different kinds of kids' minds are destined to lead different kinds of adult lives. Minds seek and should find their best ways of functioning

> during their school years, a period during which brains give off little signals that reveal what they are and are not wired for. Is anyone listening? (Levine, 2002b, p. 19)

A Traumatic Brain Injury changes a child's mind and the way he/she thinks. Teachers must be aware of this and know how to identify those 'little signals' so they can be sure that the instruction is geared to reach all of the minds in their classroom.

Over the last six years of coordinating school reentry, I have been surprised that many schools' personnel are nervous about dealing with a student with TBI. They usually are limited in their knowledge of the brain, and many teachers have expressed to me that they have no idea how to teach a child with a brain injury. There are many resources available that will explain how a child's brain works, several good ones include Levine, 2002b; Pollock, Fue, and Goldstein, 1993; and Tyler and Mira, 1999. Yet teachers need specific suggestions to adapt their lesson plans to the needs of a student with TBI. This article will demystify (Levine, 2002b) the fears of those teachers who are suddenly faced with a student with a TBI, and then give them the skills to teach that child within a class of many other "regular" students.

Once a child with a TBI is placed in a classroom, how does a teacher, general or special education, develop specific learning strategies for that child? Having a clear plan to accomplish this should ease many of the fears. The first step is to gather information about the child: strengths and interests, learning style, comprehension strength—auditory or reading, memory, thought organization, concrete or abstract thinker, fluency, grade level skills, physical accommodations needed, and attention levels (Prater, 2003). With this information teachers can then begin to adapt their lesson plans based on the child's learning needs.

PRELIMINARY STUDENT INFORMATION

STRENGTHS AND INTERESTS

To determine strengths and interests, ask the child and parents about interests and talents: how is free time used, in what afterschool activities is the child involved? Consider those as strengths for the student with a TBI. They can be used to structure learning.

Learning Style

Knowing a student's learning style before and after injury will also help in developing a diversified lesson plan. For example, "auditory learners learn through listening . . . verbal lectures, discussions, talking things through and listening to what others have to say." (What are learning styles?, 2004) If a student is an auditory learner, then writing poetry instead of prose would work better. The memorization of times tables may be easier when they are put to a specific rhythm.

Conversely, "Tactile/Kinesthetic Learners: learn through, moving, doing and touching . . . hands-on approach, actively exploring the physical world around them." (What are learning styles? 2004) Before giving verbal instructions, have the kinesthetic learners in your classroom come to the board, giving verbal instructions while they are in motion. The kinesthetic learner will focus on it while moving to the board. Many ADHD students are merely kinesthetic learners. (Levine, 2002a)

Visual learners learn through seeing " . . . the teacher's body language and facial expression . . . visual displays . . . " (What are learning styles?, 2004) They will need written instructions on an overhead, a computer or on paper. Many visual learners develop compensatory strategies of their own; i.e. taking copious notes or developing visual images. Children with TBI will also need to be taught compensatory strategies. Since a student's learning style is pivotal in developing strategies, we must first know how to determine his/her learning style.

How to Determine Learning Style

Students give off clues very quickly that tell a teacher their learning styles. Teachers should look for these clues the first day the students are in their class, and note the learning style of each student. The visual learner will focus on the verbal source (teacher, tape recorder, TV) while listening. This student will look around the room for visual stimuli when asked a question. Auditory learners talk to themselves (self-talk) while doing seatwork; they whisper to themselves while reading "silently." The kinesthetic child moves some body part when thinking; i.e. tapping a pencil, fidgeting, bouncing a knee. Knowing a child's learning style is the key to differential instruction. A child with a Traumatic Brain Injury can only learn through differential instruction in all subject areas. Since reading is a skill needed for all subjects, it is addressed first.

STRATEGIES

Reading Strategies

When developing reading strategies for the student with TBI, it is helpful for teachers to know the grade level at which the students are reading when they arrive in class. After the injury, it is important to start them at their independent level thus providing them with immediate success. In order for a child to be served by Exceptional Children Services the Individuals with Disabilities Education Act requires the administration of a battery of tests, including an academic achievement test. Look for Grade Equivalency scores, and consider that level the starting point for this child. It is not unusual for a 10th grade student with TBI to be reading at the 2nd or 3rd grade level independently. This generally means that although the student may be able to read 10th grade vocabulary, comprehension for long paragraphs is extremely poor. Paragraphs and sometimes even sentences should be broken up into 2nd or 3rd grade length for optimum comprehension.

It has been my experience that teaching through the learning strength assists the child with TBI to comprehend and recall new instruction about reading (phonics, literature, decoding skills). A strong visual learner will need instruction in written form. However, it should be in short simple phrases or in picture/symbol form, depending on the independent reading level after the TBI. In high school classes that are lecture-based, teachers can provide a good notetaker for the student with a TBI, have prepared written instructions, or inform visual learners in the classroom of where to find written instructions in the textbook.

Auditory learners may benefit from having textbooks on tape, reading written instructions aloud, or using scan-and-read software (Kurzweil 3000; Wynn Wizard). However, in addition to hearing written information, they will need back up notes to use for memory. Taping lectures for later use in studying is not effective for the child with TBI, especially if there are thought organization deficits. It is very frustrating for this child to have to rewind/fast forward to find a point to be repeated. They will still need written notes in symbol or picture form, if they are weak readers.

When reading, the kinesthetic learner should be encouraged to point to each word as it is read. It may be helpful to allow the child who is not physically disabled to stand and move from one foot to the other while reading. It is important to remember, however, that as long as it is not distracting other children in the class, a tapping pencil, shaking knee, or fidgety child should be ignored so that that child can learn.

In order to learn what is read, a child must comprehend it. This also requires recall/memory, which is generally a serious deficit with students who have brain injuries. Teachers must be aware of memory deficits in any child with a brain injury, even a mild concussion.

To aid memory and comprehension, visual learners will need notes from lectures, written instructions, and/or graphic organizers where they can note what they read as they read it (Wiig & Wilson, 2001). This written information then becomes their memory. Many of these students will need help organizing their notes for easy access. Students should refer to these notes when answering questions, either written or in class discussions, and when taking classroom tests.

Auditory learners will need the same memory strategies, but should be encouraged to read notes aloud for optimum comprehension. Kinesthetic learners could take this one-step further by acting out the information from notes or drawing pictures, thus allowing for movement.

"Critical thinking [is] the process of determining the authenticity, accuracy, or value of something, characterized by the ability to seek reasons and alternatives, perceive the total situation and change one's view based on evidence." (Alvino, 1990, p. 50) With many steps involved in critical thinking, teaching and testing critical thinking skills in reading with children with TBI becomes a real challenge. First, they have great difficulty recalling information just read. Immediately after reading/hearing the information they might recall it correctly, but have the information in the wrong order. After 15 minutes or less, it is likely that they will not recall reading the information at all. Thus the need for thorough notes, organized in a way that provides quick access of information. For younger children, teachers can use a storyboard, or have the student draw pictures for notes. Middle and high school students may need assistance setting up a memory notebook with tabs to help with easy retrieval of information. Once the students have located the information, they will likely need step-by-step guidance to take it and infer, analyze, generalize or synthesize. The majority of students with TBI have great difficulty with abstract thought processes. They will need step-by-step cues to go from data to inference or analysis. The visual learner will need each step written down, preferably on some form of graphic organizer: i.e., outline, flow chart, graph (Wiig, & Wilson, 2001). The auditory learner should repeat each step, and the kinesthetic learner should write down the steps or draw pictures/symbols.

Any child who has experienced a trauma, hospitalization, injury or emotional event will have problems with speed of thinking. "Slowness of motor speed, reaction time, speech, and thought is another deficit that persists . . .

For those students who enter school with the most severe deficits, the amount and speed of information will have to be reduced, whether it is in conversational, written or verbal form." (Rosen & Gerring, 1986, p.110) Whether it is from preoccupation with illness, fatigue, or the brain making connections much slower than normal, this student will need accommodations in order to learn. This can be anything from redirection of attention, shorter assignments, longer deadlines, or rest breaks (Pollock, Fue, & Goldstein, 1993). One rule of thumb for teachers to consider before giving reading assignments to students with TBI is: the greater the distance between the level where students read independently after a TBI, and the level they should perform, the shorter the assignments. Due to all of the compensatory strategies that a child with TBI must use to learn from reading, it is unreasonable to think that he/she could always complete the same amount of work that another student does.

Many students with a TBI will have physical deficits that must be considered in order to assist them with reading. For students with visual deficits, enlarged print or isolating words, lines, or sentences may help. Students in wheelchairs will need a table or desk that will put a book or paper to be read close enough so that they do not have to lean over to see. Another possible solution is a bookstand that raises the book to eye level. A child with upper torso weaknesses may need a page-turner. The school's physical therapist and occupational therapist should be consulted about the possibility of Assistive Technology support in the classroom.

Finally, teachers must understand attention levels based on brain fatigue of the injured brain.

> Children who have sustained even a mild TBI may have difficulty with attention and concentration, especially if injured at an early age. Problems of attention persist and appear to be unrelated to severity of injury. Problems occur in areas of focused and selective attention, inability to inhibit distracting information, and inhibiting spontaneous responses. These deficits adversely influence the child's ability to function successfully in school and to learn new material" (Tyler & Mira, 1999, p. 23).

The brain takes care of itself. When it cannot manage any more information, it shuts down. It might be for only a few seconds, but when this happens, students can neither take in information nor respond. Teachers might notice a glazing of the eyes, or a child stopping in the middle of a sentence, unable to complete a thought. Allow a minute or two for this break, then redirect the child back to the task. Eliminating distractions can also help, but this should be done based on the child's learning style. Visual learners will need a study

carrel with blank walls. Move auditory learners away from discussions. Allow kinesthetic learners to move to another spot or stand up and stretch. By the time a student with TBI returns to school, he/she should NOT need to actually sleep during a rest break. In fact, sleep is counter-productive to the healing of the brain at that point (Tyler & Mira, 1999).

Math Strategies

As with reading, assessment results are used to determine a starting point for math lessons. Visual learners learn math better when utilizing graphic organizers that set up math problems in an ordered, easily seen, step-by-step process. To comprehend word problems visual learners should use mind maps or simple drawings. Color-coded math steps help these students to see and follow multi-step problems when each step is written out in a different color with an example where that step is also in that color (Keyser-Marcus, et al, 2002).

I have used color-coded instructions with all ages and all levels of math quite successfully. This strategy gives the student an opportunity to be more independent with seatwork or homework, and is definitely worth the extra time it takes to write them. A notebook for high school math students should include a list of the formulas that they will need, with an example of when that formula should be used.

Auditory learners should be encouraged to talk or whisper their way through each step. They will need multiple repetitions of new instruction and should rely on rote memorization if possible.

Kinesthetic learners would benefit from using manipulatives and/or calculators, anything that allows them to move. However, if a student with TBI has deficits in thought organization, using a calculator will be more frustrating than useful. It is unlikely that a student with TBI would be able to enter all of the numbers in the correct order with the correct signs.

Students with language deficits and non-readers pose a different kind of dilemma when they are asked to solve word problems. There are scan-and-read software programs available that will read word problems to non-readers. That, however, is not helpful for students with severe language deficits, where they just cannot comprehend the spoken word. In these situations, writing the problem in picture form or typing the problems using *Writing with Symbols* (Don Johnston software) eliminates the spoken word and gives the student with TBI a better chance of comprehending the problem.

Physical accommodations might be necessary for students with TBI in math class. Manipulatives are useful in making a problem more concrete than abstract. A buddy could be assigned to write answers to direction. Problems

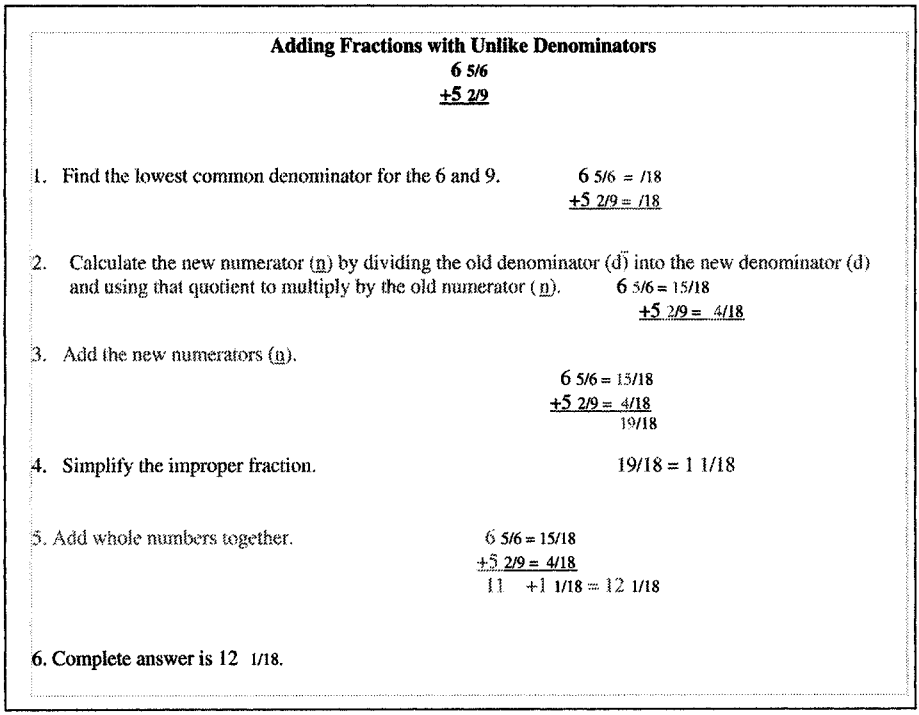

Figure 1.

Color-coded math instructions

should be written in large, bold print for those with vision deficits. As with other classes, the classroom must be wheelchair accessible, meaning that there is enough room for a wheelchair to move around the room to a desk or table at the proper height and in a spot where the student can see all that is presented. These physical accommodations and other interventions are needed to assist the student with TBI with writing in all subject areas.

Writing Strategies

Many physical factors as well as cognitive deficits must be considered when developing compensatory strategies for writing. Composition is tested in writing assessments, not the physical act of writing. Today, most secondary students write their compositions at the keyboard and rely on spellchecker and grammar check to do the nuts and bolts for them. Try not to over-complicate the composition process for a student with TBI by requiring actual written or typed "written expression." Instead, think of composition as

putting thoughts and ideas in writing for others to read. Knowing the learning style, and planning accordingly, simplifies the process considerably.

A visual learner will need written examples to follow. Whether those come from Assistive Technology programs, such as Draftbuilder and CoWriter, (Don Johnston, 2003a & b) or graphic organizers, (web, cluster, outline, Venn, or picture board) the visual learner must have each part of the composition readily visible.

The auditory learner generally can dictate compositions with ease. Having a scribe to write what the auditory learner declares gives a much better sampling of the student's composition skills. I have taught many students who stated beautiful sentences with age-appropriate vocabulary, clear thought, organized structure, even punctuation, only to have them literally write a simple subject/verb sentence. They lost their train of thought in the time it took to go from brain to hand to paper. To me, composing on paper is a test of their motor planning, not their composition skills. If a scribe is not readily available for the auditory learner, dictating into a tape recorder is an option. The auditory learner can make a beautiful composition using voice-activated computer, if trained to use one.

Bearing in mind that a kinesthetic learner must be moving for the best thought to occur, think of ways to enable activity in composition. This can be done through role-playing, drawing pictures and/or sequencing words or pictures on a board.

A group composition allows all types of learners to give their best input. Auditory learners could dictate thoughts, visual learners write them down, while kinesthetic learners act out the ideas or move the words around for clarity.

Teaching students to revise their writing has always been a struggle, but it is absolutely essential for the child with TBI. Here again, it is important to keep learning style in mind. Visual learners will require checklists and colored pencils or markers to color-code paragraphs or parts of speech. Auditory learners will need to hear their compositions and stop the reader to make changes as they hear them. Most kinesthetic learners love to cut and paste on the computer. Those in early grades can have words on word cards that they literally move around until the word order is the way they want it to read.

The concrete thinker, which includes most students with TBI, will need writing projects divided into short segments. The strategy is to write and revise, and revise again each section, then deal with transitions when combining them.

The abstract thinker will write as the thoughts occur, then follow a model or color-code strategy to organize and revise. It is difficult for teachers who are rigid, concrete thinkers, myself included, to allow this free flow of thought, but by doing so, we encourage these students to accept and even enjoy composition.

If a student with TBI is in a wheelchair, it is essential, as always, to have an accessible table or desk that will promote good writing posture, whether the student is writing on paper or typing on a computer. Due to physical impairments, Assistive Technology may be a requirement for some students. These could include, but are not limited to: software programs with word prediction, (CoWriter, Write Out Loud, Alphasmart) special keyboards, (Key Guards, Intellikeys) or voice-activated computer programs (Wynn, 2003).

No matter what strategies are selected or recommended, they must be taught to the student with TBI allowing time for repetitive practice, and providing cues to use them. Most students after a TBI try to do their schoolwork the way they always did. They must have step-by-step instruction on how to use the new systems, with consistent, continuous cueing to use them until the new strategies become the comfortable mode of learning. Developing a structured environment and plan for internalizing new methods of learning will dramatically cut down on acting-out behaviors, frustration and depression for the child who has suffered a Traumatic Brain Injury.

A good case is a very bright, excellent high school student who was also an allstar athlete. He sustained a mild concussion when he was thrown from his 4-wheeler; he was not wearing a helmet. At that time he had no physical deficits other than some double vision. Three months later, however, he still could not recall what was said to him or even what he had stated a few minutes earlier. Although he had some incredibly intuitive ideas, he had to write them down in a notebook in order to retrieve them. He commented over and over again that writing things down really helped him remember, yet he still needed cueing to do it.

This child was bright and well behaved, yet still experienced frustration with having to learn a whole new way of doing schoolwork. He had excellent family support and an in-place coping system that helped deal with this frustration successfully. However, the majority of children who experience Traumatic Brain Injuries are not so lucky. They get frustrated with their brains not working the way they want them to, or not being able to run or to speak their needs. If, in addition to these other deficits, they also have some right frontal lobe damage and are uninhibited, they will blurt or act out their frustrations in many unacceptable ways. Knowing how to respond and pre-

pare for this troublesome behavior is essential for all teachers who have a child with TBI placed in their classroom.

Behavior Strategies

Most of the requests for help that I get from schools involve behavioral issues. These are serious problems that largely do not show up until the students are back in school. It is then that they are hit with the reality of their losses. It is devastating to a fragile self-concept when the child can no longer compete in the classroom or on the playing field as before. Being proactive and preparing a behavior improvement plan for all possibilities will provide a tool for a quick response when behaviors begin to deteriorate.

Many different types of inappropriate behavior could surface: depression, poor impulse control, low frustration tolerance, poor initiation, disinhibition, and lability-uncontrollable giggling or crying. I will explain how each behavior might present itself in the classroom and what strategies might work.

Depression is the most overlooked behavior problem of the entire list. This is usually because the depressed student is quiet and not disrupting class. However, a child who distances himself from classmates, does not participate in class activities, or stops doing assignments is showing symptoms of depression. This is a very serious problem following a TBI, and one that can be more easily identified in the classroom than at home. As soon as any of these signs are spotted, parents should be encouraged to seek professional help for their child, whether for medication, counseling or both.

Students with poor impulse control grab things that they see without being able to control the need to have it, or they blurt out thoughts that they do not filter for appropriateness. These students with TBI get noticed right away because these behaviors are very disruptive. You cannot reason with a child with TBI. The majority of them cannot comprehend cause and effect situations; i.e.: If you do this, that will happen. First, you must stop the behavior, either through hand cues or gestures. Then, redirect with one-step directions, and follow through with subtle praise, such as a simple thank you, and pat on the back or the thumbs up sign.

Low frustration tolerance can be seen through angry outbursts, refusal to work, destroying work before it can be turned in, exaggerated sighs, and even quiet crying. The first thing a teacher should do when dealing with this behavior is to place oneself in the student's head. Think about how it would feel to have little to no control over your thought processes. Hopefully, this will give the teacher time to realize that punishing this behavior will not stop

the behavior and could exacerbate depression. Providing frequent rest breaks, giving shorter assignments, and teaching compensatory strategies will help the student gain more control over learning. Once the student is less frustrated, the inappropriate behaviors should diminish.

Poor initiation is another behavior that is frequently unidentified, yet quite problematic. Students who have experienced a traumatic brain injury in the right frontal lobe are most likely to suffer from poor initiation. These are the students who do not turn in homework even though it is completed, have trouble starting seatwork and rarely offer to answer questions. Teenagers with poor initiation are often viewed as belligerent yet they will not stand up for themselves. This behavior is easily managed, if it is identified. Teachers ask the student for the homework and wait for the student to get it. Putting a checklist on the desk of an elementary student or on the cover of a middle or high school student's notebook might be all it takes for compliance. (However, it will take some time to teach students how to use the checklist as a compensatory strategy for their initiation.) Teachers can also plan with the students to give specific hand cues that will act as initiation for them. These can be anything from a touch on the shoulder to pointing to the assignment on the board. Of course, before giving a hand cue, be sure to get eye contact from the student.

Disinhibition presents itself much like impulsiveness. Students with this problem blurt out comments that are thought but usually not spoken. Punishing these students for behavior beyond their control is unfair. If they are unaware of the inappropriate behavior, they should be confronted quietly and redirected. Teachers should ignore inappropriate behavior that is not disruptive.

Lability is most often seen in the early stages following a TBI, and in students who have had a stroke. It is uncontrolled, inappropriate crying or giggling. For the most part these behaviors can be ignored. Just instruct the student as if nothing were happening. Chances are the student does not even realize he or she is crying/giggling. These behaviors should cease as the student's brain heals.

Knowing what *NOT* to do is just as important in developing a behavior management plan for the student with TBI. The following is a list that is designed to help teachers have a different viewpoint of the needs a student who has a traumatic brain injury. Students with TBI cannot be treated like those with other forms of disabilities. What NOT to do:

a. Reason with the child or ask why. This confuses children with Traumatic Brain Injury and causes even more frustration and acting out.

6. Use cause/effect (if you do this, this will happen). Most children with Traumatic Brain Injury cannot make the connection from the first part to the last part.

c. Count—this adds pressure and children with Traumatic Brain Injury cannot think under pressure. They just react.

d. Repeat instructions over and over—particularly for kids with poor oral skills or poor auditory processing. This confuses them and causes frustration.

e. Raise voice—children with Traumatic Brain Injury need the adult to be in control. If the adult raises one's voice and talks faster and faster, the adult will be seen as losing control. This is frightening to the students, and they will generally become angry and defensive.

f. Punish. Always, always remember that the brain of a child with a Traumatic Brain Injury does not work like it used to or like the majority of the other kids in class. These students with TBI do not react the same way.

g. Give in. When a child with a Traumatic Brain Injury loses control and behaves inappropriately, giving in is a reward for inappropriate behavior. He/she will not learn acceptable responses this way and the poor behavior will continue.

h. Take the acting out behavior personally. Children with a Traumatic Brain Injury rarely think through their behavior or words when they are frustrated. They are also unlikely to remember what they did or what they said. It is not purposeful.

In addition to the suggestions made earlier, these are some general ideas of what TO do when confronted with a child with TBI whose behavior is inappropriate:

a. Ignore non-compliance and redirect. Chances are the child with a Traumatic Brain Injury was not able to process the information, or has poor initiation that someone just needs to get him/her started. Non-compliance is NOT defiance.

b. Reestablish eye contact and use a different modality to give direction. Instead of telling the child, demonstrate or write out instructions using symbols for the child to read.

c. Take time out. Sometimes both the adult and the child with a Traumatic Brain Injury need to back off, take time out and try again when everyone is calm.

d. Wait for compliance before moving on or rewarding.

Here are some ways to redirect visual learners:

a. Avoid using oral words
b. Get eye contact
c. Use gestures or pictures
d. Demonstrate

Auditory Learners can be redirected using these suggestions:

a. Say the child's name to establish attention
b. Eliminate as many other sounds as possible
c. Keep instruction to 2–3 word phrases
d. Speak slowly and repeat
e. Ask the child to repeat instruction. If a child with TBI hears his/her own voice, the information is more likely to be recalled.

Use the following suggestions when redirecting kinesthetic learners:

a. Touch child to get attention
b. Use hand-over-hand instruction
c. Gesture for child to demonstrate
c. Allow movement from child while learning and performing: standing at desk instead of sitting, rocking in the chair, pacing, writing in the air before writing on paper, standing at the board to do work.

It is important to remember when dealing with the behavior of a child who has sustained a traumatic brain injury that the behavior problems are due to areas of the brain not sending signals the way they used to do. It is not willful behavior, but more often comes from frustration. Channeling the behavior step-by-step from inappropriate to acceptable will teach the child what is expected and enable him/her to be successful. The more successful and approved the child is, the better behavior will become.

SUMMARY

"Be Prepared" is a motto that not only works for the Boy Scouts, but also will help make a classroom a smooth-running environment for learning. Once the teacher knows that a child with TBI is being placed in class, a plan for dealing with the instruction and behavior management of this child should be developed. Think out of the box; do not treat the child with TBI like someone who has any other disability. No Child Left Behind legislation wants all children to learn. This article has given suggestions for assisting children with traumatic brain injuries to achieve and, using them, to learn. These ideas can be used in conjunction with lesson plans with relative ease. Granted, it will take some organization and replanning at first but, as with all new things, eventually differentiating instruction will become the normal way of writing lesson plans. It is also quite possible that many of these ideas

will work for children with other disabilities. I encourage all teachers to become pioneers and develop a classroom where all children can learn, including those with disabilities.

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