

The Aural Enabler: Creating a Way for Special Needs Kids to Participate in the Classroom Lesson

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Winter 2002

Introduction

Students with literacy and learning difficulties learn to compensate in the classroom through one of two means: excelling in oral/aural discussion and information gathering, and/or removing themselves from the lesson by displaying behaviour problems, resulting in being asked to leave the classroom. Most lessons are presented through a combination of visual and auditory formats, usually using the blackboard or overhead, and listening to additional (lecture-style) information provided by the teacher. During a typical lesson, students with special needs often spend much time painstakingly copying the notes off of the blackboard. Consequently, they are unable to concentrate on the teacher's explanation and therefore fail to fully participate in class discussions. Not only do they miss important lesson information, but also miss participating in the one area in which they may excel (Hodgdon, 1995; Polloway et al, 2000).

Approximately one in ten students in Ontario schools do not benefit fully from a traditional educational program because they have a disability that impairs full participation in classroom activities (Webber & Bennett, 1999). Students with special needs are those who, because of a disability, require special education and related services to achieve their full potential. These disabilities vary with respect to the type, number, cause and degree. They can be academic, emotional, social, and/or behavioural. All these factors will affect the child's educational progress.

Students who qualify for special education services are entitled to a specially designed individual educational program (Webber & Bennett, 1999). This program must meet the unique needs of the child, including modifications to the local instruction. In recent years, demands have increased for serving all students with special needs within the regular classroom. This approach, called "full inclusion," has placed more and more students with special needs in regular classrooms, requiring teachers to find ways to fully integrate their needs within the regular class without impacting negatively on the overall class structure.

Teachers have found that technological innovations can help level the playing field for special needs students and enable these students to achieve some success in the regular classroom (Lewis & Harrison, 1988). Technology for students with special needs is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Disabilities Education Act, 1997). Encompassing a variety of both high-end and low-end technologies has proven to be useful for improving educational options for students with disabilities.

Students with learning disabilities and emotional problems account for nearly 60% of all children receiving special services in schools today (Department of Education, 2000). These students often have persistent problems learning and behaving appropriately in school. They are likely to be given a broad label indicating only that their academic and social progress is unsatisfactory because of a disability and their problems often persist despite a teacher's efforts to meet their students' needs within the regular program (Hallahan & Kauffman, 1994). Most children with mild learning disabilities spend at least some portion of the school day in the regular classroom and their teachers often find it difficult to spend significant amounts of time providing them with individual attention. Technology has proven to be an effective method of giving such students opportunities to engage in basic drill and practice, simulations, exploratory, or communication

activities that are matched to their individual needs and abilities (Baby, 1992). The research investigating the potential benefits of computer-based instruction grounded in basic learning theory indicates that use of technology can enhance a student's acquisition of skills and content knowledge when the technology computer is used to deliver well-designed and well-managed instruction (Kozma, 1994).

Purpose of the Study

This study was designed to assess the use of a SMART Board in improving literacy with special needs students. The study investigates the following questions:

- ▶ Will the SMART Board assist in improving language skills of special needs students, and as a result, stimulate positive participation and retention in classroom activities?
- ▶ Does the SMART Board improve the learning environment for special needs students?

Methodology

One SMART Board was placed with the Windsor-Essex District School Board during the month of October 2001. The special needs teacher involved in the study was provided with training in its use. The teacher was asked to use the SMART Board for a period of two weeks for all language arts lessons. Copies of the notes (saved on computer file) were given to each of the special needs students immediately following the lesson, in lieu of the students having to copy the notes into their notebooks. Students' marks (which assessed the retention of the lesson material during the week of study) were recorded. Interview data, taken from the teacher involved in the study, was recorded.

This research study was divided into three phases, a pre-SMART Board phase, an introductory SMART Board phase and a follow-up SMART Board phase. During the first half of October 2001, the grade three and grade five special needs students were provided with their normal instruction in language arts. In the second half of October 2001, the same students were given the same type of instruction with the addition and aid of a SMART Board. The group was allowed to continue working with the SMART Board through the month of January where there was a follow-up pre and post test. The researchers collected pre-test data and post-test data using spelling tests as the assessment tools. Qualitatively, interview data regarding behaviour and participation was recorded following two in-depth interviews, two months apart, with the special needs teacher.

Results

The following table gives the raw scores of a spelling test using the pre-test/post-test model with and without the use of the SMART Board. Pre-tests were given before both the traditional and SMART Board lessons, while post-tests were given following the lessons.

Table 1: Spelling Test for Grade 5 Prior to Introduction of the SMART Board

Student	Pre-test Score out of 20	Post-test Score out of 20
A	20	20
B	16	18
C	16	19
D	17	19
E	9	15

Table 2: Spelling Test for Grade 5 with the Use of the SMART Board Technology

Student	Pre-test Score out of 20	Post-test Score out of 20
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A	20	20
B	16	20
C	10	20
D	17	19
E	16	20

In this grade five class, students C and E were most affected by the use of the SMART Board. Student E has both behavioural and learning disabilities. In analysing the results, the teacher commented that this student's participation increased dramatically with the use of the SMART Board.

Table 3: Spelling Test Results in the Grade 3 Special Needs Group Prior to SMART Board

Student	Pre-test Score out of 10	Post-test Score out of 10
A	4	6
B	0	4
C	0	2
D	2	10
E	Not present	Not present

Table 4: Spelling Test Results in the Grade 3 Special Needs Group with the SMART Board

Student	Pre-test Score out of 20	Post-test Score out of 20
A	2	8
B	0	3
C	0	2
D	9	10
E	4	6

Student B has a totally modified program while student C is visually impaired and student E has tactile sensory difficulties. The SMART Board was particularly useful for student E since its devices allow easier tactile handling of writing implements. Although the results do not represent significant changes in the raw spelling scores for all students, those students experiencing the greatest difficulties in the classroom had more confidence with the addition of the SMART Board and were willing to participate more in the integrated lesson with its aid.

After four months of exposure to the SMART Board during language arts activities, the results of the pre and post spelling tests are found in the tables below corresponding to the students' grade levels.

Table 5: Grade 5 Spelling Test Following Four Months of Exposure to the SMART Board

Student	Pre-test Score out of 30	Post-test Score out of 30
A	28	30
B	23	30

C	19	26
D	9	17
*E *new student, one month of exposure	20	25

Table 6: Grade 3 Spelling Test Following Four Months of Exposure to the SMART Board

Student	Pre-test Score out of 10	Post-test Score out of 10
A	7	10
B	7	10
C	5	8
D	5	10
*E *ESL student (English is the 2nd language)	1/6	6/6

Following four months of exposure to the implementation and active involvement of the students with the SMART Board, those with the greatest difficulties appear to show the most improvement consistent to the short-term results. Student A in grade 5 has shown the most improvement since the use of the board. The special needs teacher noted that he now enjoys belonging to the group and tries hard to catch up to those in his integrated class.

Results of Interview with the Teacher after One Month

The special needs teacher enthusiastically received the SMART Board into her classroom. She noted an increase in the level of participation of all students in both grades. There appeared to be a correlation between the need for modification and the change in the degree of participation by the students. According to the teacher, the students' anxieties with making errors were reduced when using the SMART Board and they were more willing to attempt to communicate with her and their peers.

The student with sensory integration disorder resisted writing on the blackboard because of the texture of the chalk and the sound it made when used on the board. Writing on the SMART Board with the marker was a welcomed activity improving his sense of integration and collaboration with the whole group. Another student with cerebral palsy has separation anxiety. She does not want to be distinguished from the group and therefore resisted being removed from the integrated (regular) classroom. Given the notes from the board through the technology permitted her to remain in the regular classroom and still contribute to the group.

The teacher enthusiastically noted that all the students "loved the magic" (of the SMART Board). And, by far, the greatest aspect of the tool was the increased participation and reduced anxiety about making errors. By increasing participation over a longer period of time, effective learning may be achieved.

Some technical problems were observed while using the SMART Board. The teacher found that it was difficult to adjust the height of the board by herself. Students in her special needs classes vary dramatically in height and this teacher thought a simpler mechanism for raising and lowering the board by one person would be useful. Further, she noted that students with fine motor skill problems would often smudge the words while writing on the board. This had a negative effect on the printout. Some students had small handwriting, which appeared as a blob on the screen. It was also noted that uneven pressure on the pens resulted in missing letters on the screen and

printout. The teacher found that she would have to go over the students' work on the board to improve the printout for the special needs students.

These technical difficulties were definitely outweighed by the improvement in class participation and behaviour. Overall, the teacher found the tool easy to use, enthusiastically welcomed it into her classroom, and recommends it for full inclusion classes to improve the learning environment for the special needs students in these classes.

Follow-Up Interview

The special needs teacher noted that the most significant attribute was the attention and motivation the students had when working with the board. During the course of the study, there was no diminishment in enthusiasm and the students continued to want to complete most tasks using the board. The collaborative interaction within the group improved over time. This sustained motivation and persistence with the use of the board are the two key factors in aiding with learning outcomes.

The addition of sharp colour helps with multisensory learning. One of the grade three students had trouble with short-term memory and the application of colour codes to words and phonetics has shown some encouraging results. The student repeats the task by colouring in the printout to match the board work.

The special needs teacher introduced the use of the SMART Board with mathematics as well in the last month. She found it a helpful tool in teaching geometry and measurement. The use of vivid colours and the ease of pointing out the dimensions appear to keep students focused and less anxious in learning the concept. Student E in grade five (ADDHD) has shown improvement in work and in confidence with his work. He remains on task longer than with other teaching strategies.

The teacher found that by printing out the geometric figures or examples from the board followed by a task the students were less likely to make errors in their task. Traditionally, students were required to transfer the examples from the board onto their paper and then complete the task. In transferring the examples, many would make errors that were reflected in their answers to the task. In using the printouts, students' anxieties were reduced, errors were less frequent, and the task was more likely to be completed. Many of these students with fine motor issues would spend all their time just transferring the diagrams onto their paper never being able to get to the task. With the SMART Board, the information is transferred accurately from the board and the students can concentrate on the skills required to complete the task. In reducing the anxiety the students build confidence in their performance and attitude toward learning concepts.

Conclusion

The SMART Board assisted the special needs teacher in improving the learning environment for her students. All participants maintained motivation and participation levels throughout the lessons. Those with the most initial problems showed the most improvement in achievement and confidence, ergo increasing participation in their regular classroom. The tool is easy to use and enhances teaching of concepts that are often difficult with other strategies. For example, the use of vivid colour and the flexibility to change colour removes the two-dimensional aspect of trying to teach geometry. Student direct interaction with the board and its immediate feedback from printouts keep the students focused and on task. The special needs teacher enjoys working with the students and the SMART Board because of the reduced anxiety, the improvement in the concentration of the students, and the flexibility and ease of its tactile use.

Next Steps

The researchers plan to further investigate the impact on learning. A longer research period is necessary to determine if there is a positive impact on learning skills. As a result of the interview

data, the researchers intend to take the board into an inclusive classroom to investigate the use of the board as an "aural enabler" for the special needs students.

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