Teachers' Perceptions of Using the Mountbatten Brailler with Young Children.

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Abstract: This article describes the perceptions of teachers of students with visual impairments regarding the impact of the Mountbatten Brailler, used in a literacy instruction project in British Columbia, on the development of students' reading and writing skills, basic computer skills, and braille note-taking skills and the students' interaction with peers and classroom teachers.

Until the 1990's, young children with visual impairments and their teachers have used the Perkins Brailler almost exclusively to produce written work in braille. However, new technologies have increased the number of options available for recording, sending, and retrieving tactile information. Since the 1970's, efforts have been made to improve on the Perkins Brailler's standard for braille production, and many different technologies have been introduced, including the Versa braille, braille 'n Speak , and the braille Lite. Devices like the Optacon and Kurzweil Reader were developed to replace braille reading and writing through either the tactile or spoken retrieval of printed text. Still, students in the early grades typically use the Perkins Brailler as their primary device for writing (Rex, Koenig, Wormsley, & Baker, 1994). The Perkins Brailler was developed in the early 1950's (Hatlen, 2000), and its reputation as a durable, low-maintenance machine has made it the first choice as a writing tool for braille-using students.

Another option, the Mountbatten Brailler, became available in 1991. The research and development of this device was funded by a bequest in Lord Mountbatten's will for the development of a modern, low cost, portable braillewriter. The prototype was developed at the Royal National College for the Blind in Hereford, England, and Quantum Technology, of Sydney Australia, subsequently began to produce the device (Quantum Technology 2003).

The Mountbatten Brailler is an electronic braille notetaker and embosser with features that include an ergonomic keyboard, memory, speech feedback, and the ability to translate from braille to print, and print to braille (forward and backward braille-Print translation). A QWERTY keyboard can be connected to produce a print copy of a document written using braille keyboard.

Some teachers and parents have expressed concern about children using sophisticated technology at the beginning stages of Brailler reading and writing. The most common arguments against the use of electronic devices are that during the early development of reading and writing skills, children need:

- to have access to hard copy of the work that they have produced; The Perkins Brailler and the Mountbatten Brailler are the only two devices that allow a child to produce braille and immediately examine it in hard copy.
- to develop finger strength; Some teachers think that children who use the Perkins Brailler develop strength in their fingers and that a child needs strong fingers throughout life to use a variety of adaptive equipment.
- to have a low-technology option for producing braille in case the high-technology options break down; As new technological devices become available, it is important to examine their use in a systematic way to determine if they are valuable tools for children who are visually impaired (that is, are blind or have low vision). This article examines the perceptions of teachers of students with visual impairments regarding the use of the Mountbatten Brailler with young students who were learning braille.

OVERVIEW:

The British Columbia Provincial Re- source Centre for the Visually Impaired, Special Education Technology-British Columbia (SET-BC), and the University of British Columbia's Program in Visual Impairment initiated a research project in December 1998. The purposes of this project were to introduce the Mountbatten Brailler to children in early literacy programs and to provide training in the operation and use of the Mountbatten for both teachers and students. Teachers and their students were followed throughout their participation in the project (for one, two, or three years). Feed- back was requested at various points during the project from experienced teachers of students with visual impairments regarding the effectiveness of this device and its impact on both the students' development of literacy and inclusion in general education classrooms.

The considerations addressed in this research included the teachers' opinions of the students' acquisition of braille reading and writing skills using the Mount- batten Brailler, the impact of the Mountbatten on the students' inclusion and interactions in the classroom, and the effect of the Mountbatten on the students' development of computer and braille note-taking skills

METHOD:

The province of British Columbia in- vested significantly in the project by initially purchasing five Mountbatten Braillers to be distributed to children in early literacy programs. The cost of a Mountbatten Brailler was approximately four times that of a Perkins Brailler, so it was important to determine if the extra features that were included with the Mountbatten warranted the additional expense of this equipment. As part of this investment, a commitment was made by the British Columbia Ministry of Education to examine teachers' perceptions of the value of this device. At the end of the first year of the project, positive feedback from teachers encouraged the province's Ministry of Education to allocate additional funds to expand the project. Ultimately, the study described in this article ran for three years, with new students being included during the first two years. The following section-describes the selection of participants, the Mountbatten workshops for teachers and students, and the evaluation procedures used throughout the project.

SELECTION OF PARTICIPANTS:

A total of 15 teachers and their 15 students were included in the project. During the first year, 4 of the 5 students who participated were beginning braille students with no identified additional disabilities and no prior experience with a computer system or braille note-taker, and I student was diagnosed as having a moderate developmental delay in addition to a visual impairment. After the initial year, 2 participants with mild additional disabilities were included. To be included in the project, teachers were required to agree to participate in the research by completing questionnaires and unstructured interviews, attending in- service workshops, working with their young braille-reading students using the Mountbatten Brailler for most writing activities, and collaborating with general education classroom teachers and students. In addition, these teachers were selected be- cause they had primary responsibility for their students' literacy program in braille and worked directly with the students at least three times per week.

The teachers and students were recruited through an application process. Initial information was sent to teachers of students with visual impairments throughout British Columbia, who discussed the project with their students and the students' parents. If a student's educational team decided that they were interested in participating, the teacher of students with visual impairments completed and submitted an application form. Applications were reviewed by a committee of people from the participating partners in this project. During the first year, of the 14 applications that were received, 5 students were chosen on the basis of the foregoing criteria. Of the students who were not selected during the first year, all who met the criteria and were still interested were able to participate in the project in the second year.

PARTICIPANTS:

Throughout this project, 15 teachers of students with visual impairments, along with their beginning braille students from across British Columbia, were selected to participate in the Mountbatten project. The goal of the project was to determine the usefulness of the Mountbatten Brailler as a tool for initial braille instruction with young children. The project was committed to having professionals involved who were working with a variety of students and who had experience working with young children who were teaming to read and write braille. All the teachers in this study were qualified as teachers of students with visual impairments in British Columbia. Table I presents information about the teachers and students who participated in the project.

All the students were being taught to read braille as their primary literacy medium (either alone or in combination with print), attended neighborhood schools, and had the regular support of teachers of students with visual impairments. Of the 15 students, 9 had little or no useful vision and used braille as their primary literacy medium, and 6 had various degrees of useful vision and were teaming to read and write in both braille and print. Three of the 15 students had additional identified disabilities.

At the time they entered the program, 4 students were in kindergarten, 3 students were in Grade 1, 6 students were in Grade 2, and 2 students were in Grade 4. All the students had used the Perkins Brailler as their primary writing tool for braille before they entered the project. One second-grade student had received some basic instruction on the braille Lite but with limited success.

WORKSHOPS FOR TEACHERS AND STUDENTS:

Two days of professional development on the Mountbatten Brailler were offered to the teachers each year. The agenda for the first day included assembling and connecting cables to the Mountbatten, doing basic operations, using a printer (backward translation), using a QWERTY keyboard (for- ward translation), using speech feedback (Q-Talk), basic troubleshooting tips, and ideas for implementation. The second professional development day was scheduled about four months after the first. During this workshop, the teachers reviewed basic functions, use of the speech editor, troubleshooting tips, and additional teaching strategies for using the Mountbatten. They also learned strategies for using the Mount- batten as a tool in mathematics. The students in the project were brought together annually. During these get-togethers, they were able to share their experiences, demonstrate their expertise, learn some new skills, and develop new "Mountbatten user" buddies.

EVALUATION PROCEDURES:

Four types of feedback were requested and received from the teachers. First, the teachers were asked to complete logs in which they recorded their ongoing impressions daily or weekly; these logs were collected at the end of each year. Second, the teachers completed surveys twice a year that included targeted questions that were related to the goals of the project. Third, the teachers provided feedback during the professional development workshops and unstructured individual interviews. Finally, during the first year of the project, the teachers were asked to videotape the students using the Mountbatten Braillers. The teachers found it difficult to do so, and little information was gained from these videotapes, so videotapes were not requested during the second and third years.

RESULTS:

Feedback from the teachers who were involved in the project was requested via the logs, surveys, questionnaires, unstructured interviews, and participation in focused discussion groups. The research questions related to the teachers' perceptions of the impact of the Mountbatten Brailler on the students' literacy development, interactions with peers and classroom teachers, and development of computer braille note-taking skills. The following sections summarize these findings.

LITERACY DEVELOPMENT:
Writing

The teachers reported that the students were more motivated to write when they used the Mountbatten Brailler than when they used the Perkins Brailler. The following features of the Mountbatten were helpful in encouraging the students' development of writing.

Because the keyboard of the Mountbatten is arranged ergonomically and causes less fatigue in the hands and fingers, the teachers believed that the students were able to braille faster and for longer periods. One teacher estimated that her student was able to braille three times as long with the Mountbatten as with the Perkins. The teachers reported that the students were able to use the Mountbatten comfortably in a variety of different positions (on the floor, a table, or their laps). Some teachers said that it was frustrating to insert the paper, particularly when lightweight paper was used, because it crumpled more easily in the process. In addition, the teachers thought that young braille-reading students must have immediate access to a hard copy of what they have produced. The Mountbatten provides this access.

The teachers also stated that the electronic keyboard resulted in well-defined raised dots that were easier to read and that the quality of the dots was not dependent on the strength of the key depressions, thus eliminating "faint dots" that are often a problem with students who are learning braille. There was some debate about the benefits of having keys that are less difficult to press. The majority of teachers were convinced that when students do not need to push down hard on the keys, they are better able to concentrate on isolating their fingers and finding the right combination of keys required for any letter, contraction, or command. A few teachers, however, argued that using a manual brailler helps develop strength in the fingers and provides the necessary sensory feedback.

The teachers also reported that the keyboard commands allowed the students to navigate easily around the braille page. The fact that the students' hands did not need to leave the keyboard to advance or rewind the paper was seen as a benefit. The teachers reported that the erasing feature was popular with their students because, they thought, the ability to erase allows a student to produce "readable" braille, even in the early stages of learning when mistakes are inevitable. Some teachers were concerned that the erasure can leave shadow dots, but others found that saving the file and re-embossing solved that problem.

The Mountbatten's speech feature was considered reinforcing, especially for students who benefited from multi-sensory feedback. The teachers reported that the speech editor was difficult for young students to use. This difficulty was related to the editing process, not to the characteristics of the Mountbatten's speech. Because of this difficulty, many of the teachers stopped working with their students on using the speech feature for editing and instead used the same techniques for editing with the Mountbatten that they would use with the Perkins (that is, rewriting the entire text after corrections have been made on the hard copy of a braille document).

In addition, the teachers reported that the students had difficulty understanding the concept of a cursor because the auditory output is not as concrete as a visual or tactile cursor, and had difficulty navigating through the documents and understanding the results of commands because they did not have a conceptual understanding of what was happening to the text as they were moving through the commands with auditory feedback. The teachers noted that editing using speech was difficult for all the students, no matter what their ages. They believed that students who edit their work a great deal (that is, those in the upper grades) would benefit from a refreshable braille display that includes an option for tactile navigation throughout a document.

Reading

The teachers reported fewer benefits from the Mountbatten Brailler for reading instruction than for writing instruction. They believed that well-defined, consistent raised-dot output, regardless of the strength of fingers, makes it easier for young students to read their own work. They also stated that immediate hard-copy braille output provides an opportunity to combine reading and writing instruction and facilitates editing on the spot.

The teachers also noted that immediate written communication with classmates and teachers through both print and braille can be motivating for students. They were concerned about the quality of braille produced by classroom teachers, parents, or other users who do not know braille, since incorrect braille that contains typographical errors may go unnoticed and result in frustration if students have difficulty decoding messages from peers or classroom teachers.

INTERACTIONS WITH PEERS AND CLASSROOM TEACHERS:

The teachers thought that the backward-translation feature that allows students to produce print copies of their braille writing to share with teachers, parents, and class- mates is a powerful feature of the Mountbatten that fosters the inclusion of visually impaired students in classrooms. This feature reduces the need for a teacher of students with visual impairments to serve as a go-between for all a child's written work and provides a tool that encourages the classroom teacher to become more involved with and responsible for the child's instructional program.

The teachers also reported that the embossing and beeper noise can be perceived by teachers and other students as disruptive to the classroom. In addition, they were concerned that the Mountbatten Brailler and peripherals were large and took up a great deal of space, which, they thought, may be intimidating and cumbersome for children in the primary grades, although they generally thought that the Mountbatten has a user-friendly appearance that appeals to sighted primary-age classmates. After the project ended, a new model of the Mountbatten was introduced (Mountbatten Pro) that is more compact and may address the teachers' initial concerns.

The teachers stated that the feature that allows a QWERTY keyboard to be connected to the Mountbatten facilitates written communication and collaboration on group projects between braille-reading students and their sighted classmates, and thought that this feature may encourage sighted classmates to learn un-contracted braille. Even so, an examination of the teachers' logs and responses to interview questions indicated that this feature was rarely used during the project. The teachers had positive views about the design of the Mountbatten that allows sighted peers to use the Mountbatten without mixing up configuration settings by using the Disable Control Keys command.

DEVELOPMENT OF BASIC COMEPUTER- NOTETAKING SKILLS:

The project did not follow students through the transition to using a computer or a braille notetaker with a refreshable braille display. However, the teachers had definite opinions about the benefits of the Mountbatten in providing students with experience and skills that may be transferred to more advanced technology. They found that the file structure and keyboard commands of the Mountbatten are similar to those used with word processors and braille notetakers (formatting, saving, printing, and deleting files) and hence using a Mountbatten would assist their students in the transition to these devices.

OTHER COMMENTS FROM TEACHERS:

Throughout the project, the teachers made comments that were unrelated to the objectives of the project but were still important. For example, several teachers commented positively on the Mountbatten's ability to emboss both standard braille paper and regular-weight paper. One teacher used the print handout from the classroom to braille on so that the handout became a print-braille copy, which, the teacher thought,

was helpful for the classroom teacher and parents. The teachers recognized that regular-weight paper results in less-durable braille, but stated that it is more economical and quieter and can be used for copies that do not need to be saved or reused. The teachers found that the manuals included with the Mountbatten at the time of the project were difficult to use and that at first, they needed more troubleshooting help than was available. For this reason, one teacher created his own manual that has been widely distributed to other teachers who use the Mountbatten.

The Mountbatten can be used as a small production embosser when it is connected to a computer with braille translation software. The ability to save files and emboss single or multiple copies at any time was seen as a benefit. Most teachers stated that the Mountbatten Brailler is an important component of a child's literacy toolbox but that students need to feel comfortable with lower-technology options, such as the Perkins Brailler, and the slate and stylus. The majority of teachers thought that the Mountbatten is the most appropriate primary writing device for most beginning braille readers and writers. However, once basic literacy skills are established, usually in Grade 3 or Grade 4, they thought that students would benefit from using braille notetakers with refreshable braille displays, since these devices provide for direct tactile cursory routing and enhanced options for tactile editing. The teachers said that they would continue to expose their students to a wide variety of literacy tools. One teacher stated that even young children should begin literacy instruction using braille notetakers with refreshable braille displays.

An unexpected benefit of the Mountbatten Brailler that went beyond the scope of this project was its use in mathematics. The teachers reported that the students were able to use the Mountbatten in mathematics because of the ease of negotiating on the braille page. They said that they would like the Mountbatten to include a Nemeth translator so it could be used more completely for mathematics.

ADDITIONAL INFORMATION:

Although the teachers were not asked specifically about issues related to maintenance, we gathered information about re- pair and durability throughout the project. Records at SET-BC indicate that the Mountbatten was comparable to other technological devices in the number and amount of necessary repairs. During the project, a replacement Mountbatten was available if a student needed one, but in the three years of the project, only five Mountbatten's were returned for repair. The most common problems were those related to the alignment of the embossing head, dead batteries owing to infrequent charging, and broken impact-adjustment knobs.

Implications for practice:

Teachers of students with visual impairments must make decisions about the appropriate educational materials and devices to use with their students. This is often a difficult task, particularly because of the development of new technologies. One good way to determine the effectiveness of a specific device is to pay attention to the experiences of other teachers who have used the equipment. This article has described these teachers' impressions and experience with using the Mountbatten Brailler with young braille-reading children.

Discussion:

This three-year project examined the perceptions of teachers of students with visual impairments regarding the use of the Mountbatten Brailler with young students. In general, the teachers believed that this is a beneficial tool for young braille-reading children. The Mountbatten was considered "cool" and encouraged a more positive attitude toward braille by sighted peers and general classroom teachers. It was considered to have a friendly, modern design and to allow an easy go-between in braille and print. The teachers not only reported the benefits of the Mountbatten, but they proved their commitment to it by ordering additional Mountbatten Braillers for students in their caseloads who were not involved in this project. In British Columbia, approximately 40 students are currently using Mountbatten Braillers as their primary tool for writing. The majority of these children are in the primary grades. Their teachers believe that the Mountbatten can be an important part of the literacy toolbox for young braille-reading children.

Table I
Information on the participants.

	Teacher's qualification in visual impairments	Teacher's years of experience	Student's vision	Student's grade level at entry	Student's literacy media	Additional disabilities
Year I						
1	Diploma	17	None	2	Braille	Moderate developmental delay
2	Master's	12	None	2	Braille	None
3	Master's	16	None	1	Braille	None
4	Diploma	18	> 20/400	2	Print and braille	None
5	Diploma	9	> 20/400 ***b***	4	Print and braille	None
Year 2						
6	Master's	13	None	K	Braille	None
7	Master's	17	None	K	Braille	None
8	Diploma	9	Light perception	K	Braille	Language delay
9	Diploma	18	None	K	Braille	None
10	Diploma	13	20/100 ***b***	1	Print and braille	None
11	Master's	19	20/200	2	Print and braille	None
12	Diploma	20	20/400	1	Print and braille	None
13	Master's	22	20/200	4	Print and braille	None
14	Master's	25	Counts	2	Braille	None
15	Master's	15	None	2	Braille	Language delay

Diploma is a term used in Canada to refer to teachers who have qualifications in visual impairment but not degrees. The equivalent in the United States **is *certification***.
b A degenerative condition.

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