Helping One Deaf Student Develop Content Literacy Skills:  
An Action Research Report

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The development of reading skills is regarded as the highest priority area in contemporary education. Yet for many students who are deaf or hard of hearing, this is the academic area of greatest difficulty. Adding to this problem is the current demand that all students master higher levels of knowledge in content areas. In an effort to support students' needs to become literate and master content, professionals are teaching students content literacy strategies. Explicit teaching and practice of these strategies can help students become more comfortable with reading textbooks, improve their ability to succeed in content classes, increase their comprehension, and build a foundation for lifelong learning. The authors of this article present the case report of an action research study conducted with one deaf student who excelled in a general education setting through the use of content literacy strategies.

“Literacy is the most important goal of schooling” (Moats, 2000, p. 3). Students who experience difficulty in learning to read and write cannot fully participate in classroom learning, are at high risk for school failure, are at high risk for lifelong problems with employment, and have diminished avenues for pleasure. For students who are deaf or hard of hearing, the list of potential negative outcomes increases because of the essential role that literacy plays in interacting with deaf, hard-of-hearing, and hearing peers. For example, simple everyday events, such as watching television, making a phone call to a friend, sending e-mail, or asking a stranger for directions, often require literacy skills.

Learning to read is a complex, multilevel task that involves numerous attention, memory, linguistic, and comprehension skills. For many students who are deaf or hard of hearing, reading is the single most difficult academic hurdle they face. Research has indicated that the average student with a hearing loss graduates from high school with reading comprehension skills at approximately the fourth-grade level (e.g., Allen, 1986; Center for Assessment and Demographic Studies, 1991; Traxler, 2000). Several reasons have been suggested for this unsatisfactory progress, including a lack of background knowledge or prior experience, impoverished vocabularies, poor skills in decoding English, and the difficulty of recoding print into sign language (Andrews & Mason, 1991). Marschark and Harris (1996) attributed these poor reading abilities to the fact that more than 90% of students who are deaf or hard of hearing have hearing parents who do not share an effective mode of communication with their children and as a result are unable to read “aloud” to them or explicitly teach literacy skills.

Although research that identifies the causes of reading problems for students who are deaf or hard of hearing is necessary, a pressing need also exists to examine instructional methods that improve literacy skills. The No Child Left Behind (NCLB) Act of 2001 emphasizes the development of literacy. School personnel are required to demonstrate that (a) all students are reading at or above grade level by the end of the third grade and (b) they continue to make adequate yearly progress. Simultaneously, parents and lawmakers have demanded higher standards and greater accountability with regard to the acquisition of content area knowledge. Students with disabilities are expected to participate and show progress in the general education curriculum, participate in extracurricular activities, and in general learn and develop with their...
nondisabled peers (1997 amendments to the Individuals with Disabilities Education Act [IDEA 97]). As a result, teachers of students who are deaf or hard of hearing must be skilled in methods of teaching content while simultaneously teaching basic skills such as reading and writing.

In an effort to address this challenge with students with learning disabilities, several researchers (Deshler, Ellis, & Lenz, 1996; Pressley, Symons, McGoldrick, & Snyder, 1995) developed and evaluated strategies to improve students’ reading performance while simultaneously teaching them to access the general education curriculum. What follows is an overview of content strategies and a description of an action research project undertaken during explicit strategy instruction with a 14-year-old student named Susan who has a profound (NR > 100 dB) bilateral unaided hearing loss. Although a variety of professionals have advocated the potential benefits of reading strategy instruction (Andrews & Mason, 1991; Ewoldt, Isrealite, & Dodds, 1992; Luette-Stahlman & Luckner, 1991; Schirmer, 1995, 2000; Strassman, 1992, 1997), very few studies have been conducted to determine the effectiveness of these strategies for students who are deaf or hard of hearing. Existing research does suggest, however, that students who are deaf or hard of hearing use many of the same strategies to understand text as their hearing peers (Andrews & Mason, 1991; Schirmer, 2000; Strassman, 1997).

**CONTENT LITERACY**

Content literacy strategies are exactly that: strategies readers use to understand reading material in content areas such as English, math, science, and social studies. Snyder and Pressley (1995) explained that good readers have a variety of strategies that they use to help them understand the information they read. Examples of such strategies include procedures for self-questioning, constructing representational images, activating prior knowledge, summarizing information, and rereading difficult-to-understand sections of the text.

Students often enter secondary schools lacking a familiarity with expository text. Consequently, they are unaware of the strategies that skilled readers use to understand such texts. Typically, the vocabulary and text structures used in expository materials are more difficult to understand than the narrative formats with which these young people are familiar. In spite of these difficulties, teachers at this level continue to rely heavily on textbooks as a method of presenting new information about a topic (Salembier, 1999). Many students, including students who are deaf or hard of hearing, have a hard time independently developing the strategies necessary to understand expository text (Strassman, 1992). Explicit teaching and practice of content literacy strategies can help them become more comfortable with reading textbooks, improve their ability to succeed in content-area classes, and increase their ability to comprehend text materials (Salembier, 1999). Explicit instruction in three content literacy strategies was used to help one student, Susan, succeed in a general education science class.

**DEVELOPING CONTENT LITERACY: SUSAN’S STORY**

Susan was good at science. Really good. She could tell you about each planet in the solar system. She knew all the parts of a cell and could describe their functions. After an accommodation of presenting exam questions in sign language was approved, Susan scored between the 53rd and 56th percentiles on the statewide science assessment for the past two grades. Prior to the accommodation, her scores had been below the 30th percentile. She was a member of the school science club.

So why was she in a resource science class?

Susan was an eighth-grade student who read at a third-grade level (her Woodcock Reading Mastery Test [Woodcock, 1998] Passage Comprehension score was 3.4 grade equivalent). She had seen the eighth-grade science book and knew that she could not read many of the words in it. Even when Susan did understand all the words, the sentences made no sense to her. She felt intimidated by the science class, and she worried that she would not get good grades. Susan had been attending school in a self-contained environment using American Sign Language (ASL) for several years. Now that she was attending a more inclusive middle school environment, she wanted to participate in the general education courses but felt uncertain about her chances of being successful.

Susan, and students like her, can be challenging for professionals working with students who are deaf or hard of hearing. How could Susan have access to the general curriculum if she was not in the class? Was it appropriate for her to be in a resource science class based on her reading skills alone? The content of the resource class was technically the same, but the depth and breadth of information covered was simply not as extensive. Could she be supported enough to succeed in the general classroom?

It was difficult to determine what could be done to assist Susan in gaining the confidence she needed to succeed. Although students with disabilities who are included in general education classrooms “frequently need help to read and comprehend textbooks” (Masten, Stacks, Priest, Scope, & Vitale, 1999, p. 168), it was not immediately clear what kind of help would be most beneficial for Susan. A key factor in Susan’s potential for success was her content knowledge, but this asset was tempered by her limited literacy skills. Susan’s general education science teacher and her deaf education teacher considered and discarded several strategies. Eventually, it was determined that Susan’s immediate and long-term academic success would best be served through explicit instruction in a collection of strategies commonly used to promote content literacy skills. During the course of a school year, Susan was taught about text features, mental imaging, and summarization.
Text Features

One of the first obstacles students face when beginning to read is the text itself. Comprehension can be affected by various text features, including the complexity of content, linguistic features such as syntax and vocabulary, and organizational features such as style, structure, and coherence (Ewoldt et al., 1992). Well-constructed texts enable readers to gather the necessary information with the least possible effort (Ewoldt et al., 1992). Texts that have good organization, introductions, titles, maps, charts, diagrams, and illustrations are considerate of the reader. Even the most carefully designed book, however, eventually will not help a particular unskilled reader. To maximize Susan’s ability to interact effectively with the science textbook, Susan was taught the features of expository texts.

At the beginning of the school year, Susan and her deaf education teacher evaluated her textbook to identify all of the features she would be using. Each of these features was incorporated into a mini-lesson to help Susan learn how the different parts of the text worked and what they could be used for. Each of the 10 mini-lessons was approximately 15 to 20 minutes long and was designed to typify the assignments Susan would receive from her science teacher. These lessons were presented weekly during Susan’s study skills class, where she had the opportunity for individualized tutoring.

Knowing how to use features such as titles, headings, bold and italic print, figures and captions, the table of contents, the index, and the glossary can help students feel better about reading and more in control of their learning (Nolan, 1991). In addition to typical text features, Susan learned to recognize text patterns that would help her understand the organizational structure of a chapter. She learned to recognize the structures of description, sequencing, comparison/contrast, cause/effect, and problem/solution. By starting the year with an understanding of the text patterns used in the book, she was able to enter the class with a feeling of certainty. In addition, knowing about text structure helped alleviate some of the fear she felt about using a grade-level textbook. When asked about how knowing text features helped her with her science class, Susan responded, “I know how to find the answer for my homework. I don’t have to work for hours and read every word.”

Mental Imagery

Mental imagery, a method of relating text to sensory information, is another strategy that has been found to improve children’s memory (Pressley et al., 1995). This strategy is often used to help students recall technical vocabulary, an essential part of science literacy, and has been researched with students who are deaf or hard of hearing. Schirmer (1995) conducted a study to determine whether mental imagery techniques could be used with students who are deaf or hard of hearing. The participants successfully used mental imaging to help them construct meaning from the text while demonstrating qualities of higher order thinking. Based on this information, Susan was taught to use the strategy of mental imagery.

Beginning the first week of the second academic term, Susan began learning to use mental imagery. For each new unit, she identified the vocabulary she needed to learn in order to successfully understand the content. From these vocabulary words, she created mental images. Sometimes the images came from the text, with the word superimposed onto a relevant photo. Other times, Susan combined the word with ASL signs. As she indicated, “I can see the sign, then I draw a picture in my mind around the sign to help me remember.” Occasionally, Susan would identify a story with which she was familiar (often taken from the science lecture) and incorporate the vocabulary into the story, using visual reminders such as photographs or graphs from the text.

At the beginning, Susan required a great deal of assistance to create the mental images associated with each vocabulary word. During the first week, she spent about 20 minutes creating one mental image each day. She used 3” × 5” index cards to help her recall the images she had worked to develop. Each day, she reviewed the old cards before selecting new vocabulary to work on. By the 3rd week, she could create two to three images in 20 minutes, and by the 6th week she was creating about five images in the same time. At this point, she was finally able to keep up with the 20 to 25 new vocabulary items presented in class each week. Susan created some images along with the class, but her vocabulary list was inevitably longer than the lists many other students. After time and practice, Susan became quite fluent in developing mental images to help her recall vocabulary and important concepts. By the end of the term (January), Susan was using mental imagery to recall vocabulary terms without the assistance of her index cards. She still used the cards as a study aid for vocabulary tests, but she did not need them for reading routine assignments.

Summarization

At the beginning of the third academic term (March), Susan’s science teacher reported that she was doing well on assignments and vocabulary but needed more support in taking chapter tests. For these tests, students had to answer short essay-style questions. Susan’s difficulties stemmed from the fact that she was unable to write a concise statement in response to each question. In order to help Susan learn to put as much information into as little space as possible, she was instructed in developing written summaries.

Teaching students to summarize what they read can be a powerful tool for improving their long-term memory of text (Pressley et al., 1995). One advantage of using summaries with poor readers is that the students are able to take large
of her summarization skills increased. She used her science
iations. Over the remaining weeks of the term, Susan’s mastery
begin using the summarization strategy in other reading situ-
student control phased in while students are encouraged to
the summarization strategy and begin to generate summaries
for student self-control in instruction. Students must master
the process of summarization was modeled for review.

When Susan was first approached about learning to
write summaries, she rolled her eyes in exasperation. “I know
how to do that already,” she complained. “Every year we have
to summarize something.” At this point, Susan was asked to
be metacognitive and explain how she actually produced a
summary while she wrote one. Essentially, her idea was that
you should shorten all of the sentences by taking out the
words that do not add to the meaning. In many cases “not
adding to the meaning” meant that Susan was unfamiliar with
the word. It became clear that although teachers often ask stu-
dents to produce summaries, they do not often take the time
to explicitly teach them what is meant by summarize.

Pressley et al. (1995) provided guidelines for teaching
summarization techniques to students, which were used in
structuring Susan’s lessons. The first guideline is to explicitly
explain the technique when introducing it to students. Susan
participated in two 15-minute mini-lessons discussing why,
when, and where to use summarization.

The second guideline is to model the skills of summa-
ization. Teachers and speech–language pathologists should
talk through examples using the following four rules:

1. identify the main information,
2. delete trivial information,
3. delete redundant information, and
4. relate main and supporting information.

For 3 days, Susan’s mini-lessons focused on modeling these
four rules using excerpts from her science text.

The third guideline is to provide students adequate prac-
tice time and feedback. According to Pressley et al. (1995),
most studies on the effectiveness of summarization strategies
provided at least 6 hours of instruction on using this tech-
nique. Susan participated in five mini-lessons (presented
daily for 1 week) that were specifically directed at construct-
ing summarizations and included specific feedback. After
this, she was assigned to independently produce one sum-
mary each day, which was checked for feedback. On occasion,
the process of summarization was modeled for review.

The fourth and final guideline is to include allowance
for student self-control in instruction. Students must master
the summarization strategy and begin to generate summaries
independently. Teacher direction should be phased out and
student control phased in while students are encouraged to
begin using the summarization strategy in other reading situ-
tuations. Over the remaining weeks of the term, Susan’s mastery
of her summarization skills increased. She used her science
text to practice summarizing paragraphs, sections, and chap-
ters until she became quite skilled in using this technique.

Eventually, Susan decided to write summaries for each
section of her textbook chapter. These summaries were in-
cluded with her lecture notes and became a primary source of
study material for tests. Once she knew how to summarize,
Susan believed that this technique was the strongest strategy
she had learned. During the fourth term (April–June), she
began to use it for all her content classes, relating the tech-
nique to both expository and narrative text.

Outcome

After learning just three strategies to enhance her content lit-
eracy skills, Susan felt confident in her general science class.
She continued to receive support for the class and practiced
using the strategies throughout the school year. Susan re-
ceived excellent grades (a B or better for the third and fourth
academic terms) and enjoyed her experience. Susan obtained
her highest score ever on the statewide science assessment
(62nd percentile) and made nearly 1 full year of progress on her
reading skills (her Woodcock Reading Mastery Test Passage
Comprehension score was 4.2 grade equivalent) when tested
in the spring. The most important result was observed the fol-
lowing year, when Susan chose to take all her content area
classes from general education teachers. Instruction in con-
tent literacy strategies certainly did not bring about this
change single-handedly, but her experiences led to a percep-
tion of the general education environment as supportive and
secure. This change in perception was instrumental in raising
her confidence level enough for her to take the risk of en-
rolling in general education courses. In addition, other stu-
dents saw her success and were encouraged. A special series of
content literacy strategies was developed and taught to small
groups of students as part of the study skills course to support
their success in general education courses.

CONCLUSION

For students who are deaf or hard of hearing, reading is often
seen as an obstacle that keeps them from accessing the general
education curriculum. In this era of higher standards and in-
creased accountability, we need to explore a variety of ways
to help these students become literate and acquire content
knowledge. Teaching content literacy strategies is one method
that deserves greater attention and research.

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