Does Technology Support Reading Comprehension and the Inductive Method? Kristina Roys, Samantha McLeod, and Koreen Gonzales

Studies show that technology incorporated into literacy activities can promote scholastic and social success. For this reason, we chose to investigate a small niche in the overall reading comprehension research- reading comprehension for students reading short stories and participating in webquest activities while being taught by the inductive method. After review of various articles and text, it is clear that technology, or specifically for this review, the Internet does support both reading comprehension and student learning through the inductive method.

Reading Comprehension

For the purpose of this review, reading comprehension is defined as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow, 2002). Catherine Snow, the author of <u>Reading for Understanding</u>, states that reading comprehension consists of three elements: reader, text, activity; which occur within an overall sociocultural context. Snow describes each of the three elements in detail. In summary, the reader must have a broad array of capacities and abilities in order to comprehend the reading including cognitive capacities, motivation, and previous knowledge. The content, vocabulary, linguistic structure, discourse style, and genre of the text have a critical impact on the reader's comprehension. If any of these factors are not in line with the reader's prior knowledge and experience, the text may be too difficult for the reader to comprehend (Snow, 2002). Finally, activity refers to the reading activity occurring due to a specific purpose or end goal, which can be internally or externally imposed. Incomplete reading comprehension may occur if a reader does

not accept the externally imposed reading activity due to conflicting ideals of relevancy or purpose of the material.

Reading comprehension is important for students of all ages. In the article, *Fostering high levels of reading and learning in secondary students*, author Michael Graves states that research in reading comprehension is focused on primary and lower grades and is not given much attention to students beyond those grades. Graves wants to bring to the reader's attention that the "teaching for understanding" construct could potentially change the way secondary teachers teach and how the construct could influence reading. Three tasks, stated by David Perkins, must be accomplished when teaching for understanding (Graves, 1999):

- 1. Students must retain important information;
- 2. Students must understand topics deeply;
- 3. Students must actively use the knowledge they gain.

Reading is important to this construct because much of the learning that students gain will come from reading. Teachers must use scaffolding as a part of the teaching for learning process.

Graves explored the "teaching for understanding" construct of teaching to promote reading comprehension, but does not include technology within the "teaching for understanding" model. The next two articles discuss technologies impact on reading comprehension.

The article, *Literacy learning on the net: An exploratory study*, discusses results of a study designed to explore literacy researchers' and innovative teachers' views about Internet based activities and practices used to enhance student literacy. The study consisted of responses from five researchers and thirteen teachers. Additionally, observations were made in classrooms of four of the high school English teachers and one elementary school teacher while their students were participating in Internet activities. The results of the research showed that "Internet-based

learning activities make reading enjoyable for students, foster use of critical reading skills, and promote reading fluency" (McNabb, Hassel, Steiner, 2002). They also showed that understanding of the content is enhanced and higher order literacy skills are important when engaging in Internet-based activities. These are positive results which we, the KSK Collaboration group, would like to see as a result of our action research. Interestingly, the research conducted in the following article did not produce such positive results.

Ernest Balajthy, author of *Issues in technology: The effects of teacher purpose on achievement gains*, examines why research frequently indicates that although student motivation is higher when using technology based instruction, there is no real significance "between technology approaches to reading instruction and traditional approaches" (Balajthy, 2000). In the article, he discussed a study conducted in a university summer reading clinic. The students used a variety of computer programs throughout the course, but again showed no real improvement in reading. The study was startling in that it focused on teacher purpose as opposed to the students. Most of the teachers did little planning for computer sessions. They also did not set clear objectives for the computer time like they did for the traditional instruction. The computer time was simply there to motivate, not to be purposeful. So the real question is why are educators not setting goals when they use technology? Balajthy explains that the best way to get educators to start setting goals for technology is to inform them that this is critical to the success of their students.

The Inductive Method to Teaching

The inductive method is a model of teaching where students learn to classify information by categorizing. Expert in curriculum design, Hilda Taba, defines the inductive method into three parts or three inductive thinking skills. The first inductive thinking skill consists of concept formation, which is when students identify the relevant information, create logical categories based on similarities for the information, and then label these categories (Joyce, Weil & Calhoun, 2000). The next inductive thinking skill according to Taba is interpretation of data. Students reevaluate the information or data that they have categorized and begin to form opinions of how the different categories relate to one another. This stage is when students form generalities about the information. The final inductive thinking skill is application of principals. In this final stage, student use their formed generalities or proposed relationship about the information to predict outcomes or classify new information based on their specified criteria and determined relationships (Joyce, Weil & Calhoun, 2000).

An important aspect of the inductive method is that it included cooperative learning as students work in groups to categorize information. Also once students have the process started by the teacher, they are able to continue on their own with guidance, but assume more ownership of their learning as they categorize and make predictions based on their determined criteria. Through the inductive method, students are forced to reevaluate their categories and test their determined relationships. Thus students form a deeper understanding of the information (Joyce, Weil & Calhoun, 2000).

The inductive method is applicable for all students; although depending on their cognitive level, some students will have more developed relationships than other students. Also according to a study by Joyce, Peck and Brown (1981), the inductive method works for both flexible and rigid students, but more flexible students had more success at first with the inductive method. It would seem accurate for flexible students to be more successful since the categorizing of data would necessitate students needing to revise categories based upon the discovered information.

Also students would need to reevaluate categories if predictions based upon the determined relationships did not work (Joyce, Weil & Calhoun, 2000).

The inductive method is a valuable method to teach critical thinking or logic. P. Ilkuenobe's article, Teaching and assessing critical thinking abilities as outcomes in an informal *logic course* (2001), argues against the teaching of logic or critical thinking as alone process. Ilkuenobe states that it is important to learn to think critically by learning to think critically about a subject. The inductive method is an essential method to teach critical thinking by having students to think critically about subject information through categorizing and determining relationships. The inductive method has the students moving from premise to conclusion such that the information content of the conclusion is more than the information content of the premises; hence the premises only render the conclusion probable (Ilkuenobe, 2001). Therefore to use the inductive method with students is to have the students understanding of relationships between the information more important than the factual information itself. Using the inductive method not only gives students the opportunity to learn about a subject, but also has students critically thinking. In this way students are taught critical thinking, but not through implicit instruction. The knowledge that students gain is created and owned by the students as they create and test relationships between the data. Also students can form better conclusions or relationships between ideas when given better facts.

The use of the Internet is how a student can gather better facts thus resulting in better relationships. K. Molnar and R. Sharda's study, Using the Internet for knowledge acquisition in expert systems development: a case study (1996), show a majority of Internet users use the Internet for information and knowledge. The Internet is a valuable resource in knowledge acquisition and providing accessibility to resources (Molnar & Sharda, 1996). Knowledge

acquisition is divided by Molnar and Sharda into four stages consisting of: understanding the domain, identifying experts, analyzing knowledge acquisition techniques and designing procedures to acquire knowledge (Molnar & Sharda, 1996). The most valuable to our research question is the third stage of knowledge acquisition. There are two methods of either deductive or inductive. For our research question the focus that the Internet can be used to support the inductive method was important. According to the study, the Internet supported the inductive method through making available credible facts and access to experts.

Webquests

When reading various articles and conducting numerous searches on webquests, the articles and results always pointed to one person, Bernie Dodge, the founder of webquests. Naturally, we had to visit his website.

Dodge explains that he did not create webquests, but he put a name and structure to them. He starts by defining a webquest as "an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet..." (Dodge, 2003). He goes on to say that webquests can be broken into two categories: Short and Long Term. Most traditional webquests are short term projects.

Next, he outlines the critical attributes. Webquests have six essential attributes: introduction which sets the stage by asking the research question usually in some creative way, a task that is attainable, information sources (resources) that can be anything from books and magazines to webpages, a process which is the method the students must go through to complete the project, guidance to demonstrate how to organize the information acquired, and a conclusion that brings the project to a close. He closes his webpage by giving some links to examples and resources to create webquests.

Linda Braun is an author who sites Bernie Dodge's findings within her own work. In the article, In Virtual Pursuit, Braun summarizes a conference she led on webquests. In the beginning she had a great deal of skepticism about a webquest being simply a "glorified worksheet." She agreed that if not done correctly, it can become one. However, there is a process to creating a good webquest. Taken from Bernie Dodge, "the father of webquests" (Braun, 2001), Braun states that webquests need to be broken into sections in order to be affective: Task, Resources, Process, Evaluation, and Conclusion. The way a webquest is organized is the key difference between it and traditional research. Besides breaking webquests into sections, there are a couple other attributes needed for a successful webquest. Webquests need to ask a question of the students that requires them to take the information they have gathered and make a decision based on those facts to answer the question. If a webquest is done collaboratively, each person in the group needs to have a specific role to complete (which seems to be the case in any work that is done collaboratively). Finally, the webquest needs to be presented in such a way that even those students who are not "tech savvy" can navigate throughout the site with ease. This is important because the students need to be able to focus on answering the research question, and not so much on the technical aspects.

Summary

Reading comprehension is a prerequisite to a student's scholastic and social success. Educators need to ensure that students are receiving the appropriate instruction to foster their learning and comprehension of literature to see that these successes are accomplished. It seems clear that in order for students to achieve well on any assessment, there needs to be clear goals outlined for those students. In a webquest, goals are set in the introduction by giving the student a research question in a creative way—You are a private investigator sent to find out if King Tut died of natural causes or if was he murdered. However, it is not sufficient to just give students the goal. Educators need to treat technology lessons such as webquest as they would a traditional lesson. Scaffolding needs to be done so students can find the sources to answer their question. Teachers need to set up group roles for collaborative work. Extension activities need to be planned. Discussions need to be formed. Wait a minute! You mean technology is not going to take over the teacher's role in the classroom?

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