

# Multimedia Instruction: A Path to Information Literacy for Students with Special Needs

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**Abstract:** A group of middle-grades students served in a Special Education Information Literacy class were taught a 6-step procedure for completing a research report through the use of an interactive multimedia instructional unit. The students were surveyed pre- and post-intervention to describe experiences, changes in learning and increase or decrease in self-confidence with completing research assignments. A pre-intervention assessment, in the form of a 250-500 word research project, was scored using a typical middle-grades research grading rubric. The students and the teachers maintained daily journal entries to describe experiences, learning, and self-confidence during the intervention. A similar post-intervention assessment was used to determine the percentage of change in skills possibly attributable to the multimedia instruction. While the rubric scores of the students increased from 100 to 167% after the multimedia instruction, the scores remained below the minimum passing score. Students experienced difficulties with the time allotted for each lesson, indicating they needed more time and practice to internalize the procedure.

## Introduction

How can information literacy skills be effectively taught to students with special needs? Is there a format the students can use as a self-check to assure they've done a thorough job with locating, evaluating, synthesizing, and using information? Could a teacher-made multimedia unit provide a motivating and enjoyable learning experience?

The administrators of the middle school where I teach have embraced an aggressive approach to inclusion of students with special needs in the regular classroom, with 86% of those students served in inclusion at least one period per day. During a year collaboratively teaching in middle grades classrooms, I became concerned about the ability of students with special needs to complete a quality research project. To address this problem, I developed a support course emphasizing information literacy. The course utilized technology, including multimedia, to teach computer application and information literacy skills through content in the Georgia Performance Standards (Georgia Department of Education, 2005).

My action research project was carried out in a middle school located in Northwest Georgia. The population of 1304 students consisted of 60.7% Hispanic, 26.5% White, 8.1% Black, 3% Indian, 2.6% Asian, and 1.8% multiracial; 11.9% were identified as special needs. The students targeted for intervention consisted of 47.8% Hispanic, 26.1% White, 23.9% Black, and 2.2% Asian.

Computer, digital, and information literacy are terms that are used interchangeably, although some differences in their meanings exist. Literacy has typically meant the ability to read, write, and comprehend language at a functional level for an individual's society, which is interpretable as the ability to process information (American Library Association, 2005). According to Kasprzyk (n.d.), computer literacy was a term applied to computer programmers from 1945 to the advent of personal computers in 1985. To be computer literate, a person would have to know how to use a computer and at least one program language (Kasprzyk, n.d.). Computer literacy now refers to the ability to use a personal computer, the Internet, and the appropriate software for general purposes (Ehrmann, 2004). Gilster (1997) defined digital literacy as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers" (p. 1). Tyner (1998) elaborated upon the definition of digital literacy by introducing tool literacy and literacy of representation. Tools include computers, networks, and other technologies. Representations are the visual and media depictions of information.

Paul Zurkowski coined the term *information literate* in his 1974 report to the National Commission on Libraries and Information Science. According to the definition provided by the American Library Association (1989), "to be information literate, a person must be able to recognize when information is needed and have the

ability to locate, evaluate, and use effectively the needed information” (para. 12). These literacies, including their individual and myriad facets, are indigenous pieces of a composite concept called information literacy (American Library Association, 2005).

In a 2003 report to Congress, the U.S. Department of Commerce reported that information literacy skills are becoming increasingly important for academic and vocational success (U.S. Department of Commerce, 2003). Success is highly dependent upon entry-level technology skills and a person’s ability to learn new technology. The workplace is increasingly competitive, mobile, and automated, requiring workers to be information literate by current standards (Abilock, 2004).

Information literacy is crucial to the future success of students of all ages (Plotnick, 2000). Information literacy is a transformational process that allows the learner to manipulate information for “personal, social, or global purposes” (Abilock, 2004, p. 10). When students become information literate, they also become lifelong learners (Burkhardt et al., 2003).

There are several models used to teach information literacy skills. Two of the most popular approaches are the Big6 and EUREKA. The Big6, created by Mike Eisenberg and Bob Berkowitz, is one approach to teaching information literacy skills (Big6 Associates, 2005; Eisenberg, 2005). The Big6 skills include task definition, information-seeking strategies, locating and accessing information, using information, synthesizing information, and evaluation of the final product. EUREKA is a 6-step model developed by media specialists at William Floyd High School in Mastic Beach, New York. EUREKA is an acronym for **E**stablish the research topic, **U**nderstand the variety of possible resources, **R**etrieve the best resources for the job, **E**xamine and extract relevant information, **K**nit the information into a whole, and **A**ssess the final product (Hubel, 2005). Both models report success in teaching information literacy skills to students and are conceptually alike.

Implementing technology into instruction has become a standard in public school systems in the United States (U.S. Department of Education, 2004). Utilizing multimedia presentations is one method of infusing technology into the instructional process. Studies have shown that multimedia is effective with students with special needs. For example, Mechling, Gast and Barthold (2003) concluded multimedia instruction was effective for use with mentally challenged students. The multimedia provided simulation and interactive practice in settings where the actual event was difficult to replicate. Multimedia instruction can be used to establish routines and habits for students with special needs (Kimball, Kinney, Taylor, & Stromer, 2003). According to several studies (Blair, Gardner, Fischer, Ryker, & Toperzer, 2001; Gardner & Edyburn, 2001; Gardner, Wissick, Schweder, & Canter, 2003; Okolo, 2000), thematic units enhanced with presentation or interactive technology have been effective in improving educational outcomes for students with special needs. The units increased attention to and engagement in the activities, thereby increasing learning. Multimedia-based instruction led to significant gains in the ability of students with special needs to generalize learning to a regular education setting and the community (Mechling, Gast, & Langone 2002; Wissick & Gardner, 2000).

In the literature, multimedia is presented as an effective tool for teaching students with special needs (Blair et al., 2001; Gardner & Edyburn, 2001; Gardner et al., 2003; Kimball et al., 2003; Mechling et al., 2002; Mechling et al., 2003; Okolo, 2000; Wissick & Gardner, 2000). I developed a multimedia instructional unit that teaches students a 6-step information literacy model for completing research projects. The experiences of the students and teacher with the multimedia unit were the basis of my project. I wanted to determine if the students’ self-confidence levels and information literacy skills would increase after multimedia instruction.

## **Method**

### **Participants**

My study involved 12 of the students with special needs served through the Information Literacy course. Four students were chosen deliberately from each sixth-, seventh-, and eighth-grade class. The students were chosen with intent to represent the demographics of the school and exhibit varying disabilities, learning styles, and motivational levels. Two students from each grade level, for a total of six, were Hispanic; two were White; three were Black; and one student was Asian. The students were specifically learning disabled, mildly intellectually disabled, and emotionally/behaviorally disordered. Consent for participation in the study was obtained from the school administration, parents of the students, and the students. All students in the Information Literacy course participated in the activity, but data was maintained on only the 12 selected students.

### **Intervention**

The research was implemented during a two-week period within the time-frame and context of the Information Literacy course. The instructional unit included a modified version of a 6-step model of information literacy and was presented in a multimedia format. The 6-step information literacy model was a paper-based, fill-in-the-blank organizational guide for planning, completing, and evaluating a research project. The multimedia instruction was web-based and contained graphics, text, and sounds. It introduced and reinforced the use of the 6-step model to complete a research project through identifying and explaining the steps, offering examples of correctly completed steps, and guiding the student through the steps. At the culmination of the unit, the students should have produced a research project. The internal assessment artifact was the completed organizational guide. Research projects were assessed using a middle-grades research project assessment rubric (TeAchnology.com, 2005).

The multimedia unit introduced the information literacy model, provided instruction and practice, and formatively assessed whether the students completed each step. As part of learning the 6-step information literacy model, the students developed a research project which served as the summative, authentic assessment within the multimedia.

### **Data Gathering Techniques**

For the pre-intervention assessment, a separate assignment was given for each grade level to encompass grade-appropriate topics in science. The students had access to books, encyclopedias, the internet, a word processor, and a graphic organizer tool. Graphic organizers are devices that help a writer organize ideas. A tool for developing a graphic organizer provides text boxes and links that writers can use to develop an idea web. The research assignments generated by the students were graded on a middle-grades research project rubric with a maximum score of 20 spread over five indicators.

The students were surveyed pre- and post-intervention to determine their information literacy skills and perceived self-confidence with research assignments. The questionnaires used Likert-scale numeric indicators ranging from strongly agree to strongly disagree. Student perceptions were quantified and compared from pre-intervention to post-intervention.

During the intervention, the students maintained a structured journal. Daily entries consisted of a Know/Want to Know/Learned (KWL) chart (Ogle, 1986), three questions about their confidence toward the lesson with Likert-scale responses for quantification, and an area for comments. I kept a daily journal to record my experiences, and add triangulation to the students' opinions of their engagement and self-confidence levels. My journal consisted of a Likert-scale type checklist for my perception of the students' engagement, learning, and self-confidence. It provided a space for anecdotal entries. The student journal entries regarding confidence levels were quantified for comparison to my journal.

The formative assessment products within the multimedia lessons were evidence of self-confidence and objective mastery during the intervention. The students, through entries in their journals, provided perceived objective mastery. My evaluations of objective mastery by the students were added to my journal for comparison to the multimedia assessments and students' entries for triangulation of data.

The intervention lasted eight days for 55 minutes per day. Pre-intervention research projects were assigned before implementation. The multimedia instruction spanned a 6-day period, with one step introduced and practiced per day. On the first day, I talked the students through the directions and explained navigation through the website. We discussed objectives of the unit. I emphasized the 6-step model as the goal compared to the internal research project which was merely a side-effect of the instruction.

During instruction, I intervened when students lacked understanding by re-reading instructions and explaining the text. I provided examples and non-examples and assisted with software issues. My interventions, while necessary and beneficial to the students, were an influence on the outcome of the research. The results of the research are not reflective of multimedia instruction in isolation from teacher-intervention.

Post-intervention assessment involved a different set of assignments in the same format and with the same instructions as the pre-intervention assessment. Identical materials and time were allowed for pre- and post-intervention assessment. Pre- and post-intervention rubric scores were compared at the student and whole group level. After the intervention, students were interviewed to determine their opinions of the multimedia instructional unit and the 6-step information literacy model. The interviews were quantified to provide the basis for a discussion of their opinions.

## Results

Table 1, Rubric Scores, shows the pre-and post-intervention assessment. Students were ranked from 1 to 12 based upon the highest to lowest initial rubric scores. The differences are shown in percentage of increase. The range of pre-intervention scores was from 3-5 points of a possible 20 points. The average pre-intervention score was 4. The range of post-intervention scores was from 6-11 points of a possible 20 points. The average post-intervention assessment score was 8. The students' percentage of point increase ranged from 100% to 167%. The whole group percentage of point increase was 100%.

Rubric Scores Ranked from high score to low score				
Pre-intervention		Post-intervention	Point Increase	% Increase
Student 1	5	11	6	120%
Student 2	5	10	5	100%
Student 3	5	10	5	100%
Student 4	4	9	5	125%
Student 5	4	9	5	125%
Student 6	3	8	5	167%
Student 7	3	8	5	167%
Student 8	3	7	4	133%
Student 9	3	7	4	133%
Student 10	3	6	3	100%
Student 11	3	6	3	100%
Student 12	3	6	3	100%
Whole Group	4	8	4	100%

**Table 1: Rubric Scores**

Pre-intervention student survey results, shown in Table 2, indicated that 75% of them agreed that teachers assign research projects at least once per school year. Likewise, 75% of the students were confident that they could complete the research projects assigned, while 50% claimed they turn the projects in on time. Less than a majority, 33.3% admitted to unpleasant stress while doing a research project. Seventy-five percent of the students reported understanding and using at least one step-by-step procedure for completing a research report. Of those students, 67.7% stated that the step-by-step procedure helped them produce quality projects. Seventy-five percent of the students believed they could earn an A; 66.7% believed they could earn at least a B; and 58.4% believed they could earn a C on a research project. Of the students, 41.7% could explain the reasons why a lower grade than expected was earned on a research project without feedback. Of the students surveyed, 75% reported they believed that they could successfully use technology to complete a research project.

Post-intervention student survey results, also shown in Table 2, indicated that 75% of students agreed that teachers assign research projects at least one time per school year. Seventy-five percent of the students believed they were able to complete research projects assigned to them by teachers, and 41.7% said they turn the research projects in on time. Of the students, 50% experienced unpleasant stress when doing a research project. All of the students (100%) said they knew at least one step-by-step procedure to follow for completing a research project at the end of the unit. Of those students, 91.7% said they used the procedure to complete research projects and that it helped to produce a quality research project. Seventy-five percent of the students believed they could earn an A. Seventy-five percent believed they could earn at least a B, and 57.4% believed they could earn at least a C on research projects. Earning less than expected on a research project could be explained by 41.7% percent of the students without feedback. The ability to use technology successfully to complete a research project was reported by 67.7% of the students.

Student Perception Surveys										
Question	Strongly agree		Agree		Don't Know		Disagree		Strongly Disagree	
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
My teachers assign research projects at least one time per school year.	25.0	25.0	50.0	50.0	0.0	0.0	16.7	25.0	8.3	0.0
I believe I am able to complete the research projects assigned to me by my teachers.	25.0	33.3	50.0	41.7	16.7	25.0	8.3	0.0	0.0	0.0
I turn in research projects on time.	16.7	16.7	33.3	33.3	50.0	25.0	0.0	16.7	0.0	8.3
Doing a research project causes me unpleasant stress.	8.3	16.7	25.0	33.3	33.3	25.0	16.7	16.7	16.7	8.3
I know at least one step-by-step procedure to follow for completing a research project.	8.3	83.3	16.7	16.7	16.7	0.0	8.3	0.0	0.0	0.0
I use a step-by-step procedure to complete a research project.	8.3	25.0	66.7	66.7	25.0	8.3	0.0	0.0	0.0	0.0
A step-by-step procedure helps me complete a quality research project.	25.0	50.0	41.7	41.7	25.0	8.3	8.3	0.0	0.0	0.0
I can earn at least a C (70%) on the research projects I produce.	16.7	16.7	41.7	41.7	16.7	25.0	8.3	8.3	16.7	8.3
I can earn at least a B (80%) on the research projects I produce.	41.7	50.0	25.0	25.0	16.7	16.7	8.3	8.3	8.3	0.0
I can earn at least an A (90%) on the research projects I produce.	25.0	33.3	50.0	41.7	8.3	16.7	16.7	8.3	0.0	0.0
When I earn less than expected on a research project, I generally know why without being told by someone else.	0.0	0.0	41.7	41.7	41.7	41.7	8.3	16.7	8.3	0.0
I can successfully use technology (a computer, the Internet, software programs) to complete a research project.	50.0	41.7	25.0	25.0	25.0	25.0	0.0	8.3	0.0	0.0

**Table 2: Comparison of Pre- and Post-Intervention Student Perception Surveys (in %)**

Table 3 shows the percentage of change in each area of student perception. Most of the students moved closer to the middle (don't know) and bottom (disagree) on the spectrum of agreement. The largest percentage of change was in students who know at least one step-by-step procedure to complete a research project, which showed a 75% increase.

Student Perception Surveys (Change)					
Question	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
My teachers assign research projects at least one time per school year.	0.0%	0.0%	0.0%	8.3%	-8.3%
I believe I am able to complete the research projects assigned to me by my teachers.	8.3%	-8.3%	8.3%	-8.3%	0.0%
I turn in research projects on time.	0.0%	-8.3%	-16.7%	16.7%	0.0%
Doing a research project causes me unpleasant stress.	8.3%	8.3%	-8.3%	0.0%	-8.3%
I know at least one step-by-step procedure to follow for completing a research project.	75.0%	-50.0%	-16.7%	-8.3%	0.0%
I use a step-by-step procedure to complete a research project.	16.7%	0.0%	-16.7%	0.0%	0.0%
A step-by-step procedure helps me complete a quality research project.	25.0%	0.0%	-16.7%	-8.3%	0.0%
I can earn at least a C (70%) on the research projects I produce.	0.0%	0.0%	8.3%	0.0%	-8.3%
I can earn at least a B (80%) on the research projects I produce.	8.3%	0.0%	0.0%	0.0%	-8.3%
I can earn at least an A (90%) on the research projects I produce.	8.3%	-8.3%	8.3%	-8.3%	0.0%
When I earn less than expected on a research project, I generally know why without being told by someone else.	0.0%	0.0%	0.0%	8.3%	-8.3%
I can successfully use technology (a computer, the Internet, software programs) to complete a research project.	-8.3%	0.0%	0.0%	8.3%	0.0%

**Table 3: Percent Change Between Pre- and Post- intervention Student Perception Surveys**

Table 4 shows students' reported confidence levels. On the first day, 33.3% of the students showed positive self-confidence toward Lesson 1. An overview of Lesson 2 evoked a 63.9% positive self-confidence level. Day 3, Lesson 3, brought a positive response from 63.9% of the students, again. Day 4 exhibited a decrease, with only 50% of the students reporting self-confidence in the lesson. On Day 5, the numbers rose to 55.6% of the students

reporting positive self-confidence. Day 6 had only 33.3% of the students confident that they could complete, enjoy and learn from Lesson 6.

Student Confidence Levels					
1 = Strongly disagree 2 = Disagree 3 = Don't know 4 = Agree 5 = Strongly agree					
	Indicator	I believe I can do the work in the section for today	I believe I will enjoy the work in the section for today	I believe I will learn something today	Confidence Total
Day 1	1	0	1	0	2.8%
	2	1	2	3	22.2%
	3	3	6	6	41.7%
	4	6	2	1	25.0%
	5	2	1	0	8.3%
Day 2	1	0	0	0	0.0%
	2	0	0	0	0.0%
	3	0	0	0	0.0%
	4	5	3	5	36.1%
	5	6	6	6	50.0%
Day 3	1	0	0	0	0.0%
	2	0	0	0	0.0%
	3	2	1	10	36.1%
	4	8	9	1	50.0%
	5	2	2	1	13.9%
Day 4	1	0	0	0	0.0%
	2	1	2	1	11.1%
	3	7	6	1	38.9%
	4	2	3	7	33.3%
	5	2	1	3	16.7%
Day 5	1	0	0	0	0.0%
	2	1	0	1	5.6%
	3	19	3	1	38.9%
	4	1	7	8	44.4%
	5	0	2	2	11.1%
Day 6	1	0	0	0	0.0%
	2	0	1	3	11.1%
	3	5	9	6	55.6%
	4	6	1	2	25.0%
	5	1	1	1	8.3%

**Table 4: Student Confidence Levels**

My perceptions of student confidence, shown in Table 5, varied from the students' perceptions. On Day 1, my observations indicated that 8 of the 12 students were either willing or eager to try the activity. On Day 2, 10 of the students were willing or eager to try. Day 3 had 11 of the students showing positive confidence. Day 4 captured 11 of the students' self-confidence levels. Day 5 dropped to 10 students who were eager or willing to try the activity. Day 6 rose to 11 of the students engaged at a self-confident level. One student during the entire 6 days was openly rebellious to engaging in the multimedia instructional unit.

Teacher Perception of Student Confidence					
Indicator	Eager to try (Certain/Confident)	Willing to try (Maybe)	Willing to try (Don't Know)	Reticent, but trying (Low Confidence)	Unwilling to try (No Confidence or Rebellion)
Day 1	3	0	5	2	2
Day 2	4	2	4	1	1
Day 3	5	4	2	0	1
Day 4	9	2	0	0	1
Day 5	3	2	5	1	1
Day 6	10	1	0	0	1
Confidence Total	47.2%	15.3 %	22.2%	5.6%	9.7%

**Table 5: Teacher Perception of Student Confidence**

Results of the final student interviews are shown in Table 6. Seven of the 12 students reported finishing the unit. Two students said they could complete most tasks independently, but 10 reported they needed the teacher or a peer to assist or guide completion. Seven of the students said they were able to complete the activities within the given time. Eight students reported being focused on the assignments; four students reported being easily distracted. Ten of the students found information and materials within the multimedia easily located. All twelve students said the website was easy to navigate. Eleven students said the graphics and sounds increased interest. Nine students reported they were able to assemble all the parts of the research project into a final product. Eight students believed they were better able to create a research project directly attributable to the multimedia unit.

Student Interview Results		
Question:	Yes	No
Did you complete the information literacy unit?	7	5
Were you able to complete most tasks by yourself?	2	10
If not, did you need the teacher or other students to assist/guide you?	10	2
Were you able to complete the tasks within the class time?	7	5
Were you focused on the assignments or were you easily distracted?	8	4
Were information and materials easy to locate?	10	2
Was the website easy to navigate?	12	0
Did the graphics and sounds make the unit interesting to you?	11	1
Were you able to assemble all the parts of the research project into a final product?	9	3
Do you believe you are better able to create a research project because of what you learned from the unit?	8	4

**Table 6: Student Interview Results, Post-assessment**

Anecdotal notes from the student journals contained responses of “It’s OK,” “This is fun,” and “Nothing to say.” The students were willing to fill in the KWL chart, although they were filled out with information about the topic they chose for their activity rather than with information about the 6-step procedure.

With Lesson 4, the students began to comment about specific aspects of the lessons. The most predominant comment was that the lessons were moving too quickly, and that they needed more time to complete, learn, and understand the information within the lessons. The students almost unanimously reported that they needed more in-depth explanation that was individualized to their questions than the multimedia provided. Student journals reflected that students were not completely clear on the objectives until they were into Lessons 4 and 5, although the objectives were clearly stated in the directions and in each lesson. The students mistakenly thought the objectives were to learn about the research topics, rather than how to complete them. Anecdotal notes from my journal indicated there was student confusion related to the objectives. The students saw the objectives as the topic information rather than the 6-step procedure objectives. My notes showed that students consistently asked for explanation or reinstruction on lesson activities, especially in Lessons 1 through 4. When the students entered Lesson 4 and realized they were going to create a web or index cards with notes, engagement levels increased and confusion decreased. Most of the students finished the webs or index cards. One student completed a web and a writing outline.

During Lesson 5, the students began constructing projects, and the rate of work slowed down. Few students completed the actual research projects. Only one student finished all parts of the multimedia unit and a research project. Lesson 6 seemed interesting to the students, and all but one appeared authentically engaged. That one student was engaged in open rebellion throughout the multimedia unit. This student, who often logged, “This is stupid,” was the emotionally/behaviorally disordered student. She is diagnosed with oppositional/defiant disorder. Refusal to participate or complete assignments, and her comments referencing the “stupidity” of the assignments and teachers, is a common thread throughout her classes and is a function of her disability. Although she did not participate or do any of the assignments, she perused the website, reading the material, and I believe she did gain some knowledge from the exposure. I noted that, throughout the multimedia unit, most students needed teacher intervention to understand and remain engaged in the lessons.

## **Conclusions and Implications**

The purpose of my study was to determine if a multimedia instructional unit teaching a 6-step model of information literacy to students with special needs was effective in increasing information literacy skills and to describe the experiences of the participants. I wanted to describe the experiences of middle grades students as they used a multimedia unit to complete a research project, describe if and how the students’ self-confidence in completing research was affected by the multimedia unit, and determine if any change was exhibited in the quality of the research projects created by the students after instruction.

The student with the least gain between the pre- and post-intervention research project rubric scores doubled the rubric score which translates to a 100% gain. The average gain was 120%. While these increases are significant, the final high score of 11 was below the minimum passing score of 14. The percentage of gain would indicate that the multimedia was effective in increasing the students’ rubric scores. The final score of 11/20, which converts to 55%, remains a failing grade and would indicate that the multimedia instructional unit’s effectiveness was limited. Prior experience with the students promotes accepting that the multimedia instructional unit was effective in increasing the students’ rubric scores on research projects. The pre-intervention assessments were lists of websites that could be accessed for information or portions of websites copied and pasted into the word processor and labeled a research report. The post-intervention assessments consisted of graphic organizers, references, and minimal organized information. Some of the organized information was reworded by the students into the semblance of a research report. A repeat of the unit might produce a comparable increase in scores, which would likely result in a passing score range for all but the lowest scoring students.

The increase in scores may not be totally attributable to the multimedia, nor could the multimedia be the focus of blame for the persistence of a failing grade. Significant teacher intervention was required throughout the unit. Teacher intervention in the form of supplemental and supportive teaching might have been the impetus for the increase. Lessons 4 and 5 were rushed and needed more time for mastery. If the lessons had been broken down into smaller parts and extended over a longer period of time, the scores might have been higher.

Student perception surveys showed that the students moved from the extremes of agreement/disagreement toward a central score of “don’t know.” When students were asked to agree or disagree with the statement, “My teachers assign research projects at least one time per year,” they changed their answers between pre-intervention

and post-intervention, although the question inherently requires an identical answer on both surveys. This change might be credited to random answers from the students, a lack of understanding of the definition of a research project, or a state of confusion about the instrument item.

On most days, a majority of the students reported confidence in their abilities to successfully complete the multimedia lessons. Without any prior knowledge of what would be in the multimedia unit, the low percentage of students with positive self-confidence on the first day could be anticipated. After the students finished the Directions section and Lesson 1, confidence in their ability to complete the multimedia unit blossomed. This high level of confidence continued with Lesson 3, but decreased for Lesson 5. The indicators of self-confidence were based upon experience from the previous lesson or experience. The first day, students had no experience with the unit, and self-doubt was stronger than self-confidence. On day 2, after a talk-through on the directions, the students participated in Lesson 1 at an almost independent level. Success with independent interaction with the multimedia on Lesson 1 created the sense of confidence for Lesson 2. Success with Lesson 2 created a sense of confidence for Lesson 3. Lesson 3 was more difficult and required more teacher intervention for success; therefore, confidence for Lesson 4 waned. Lesson 4 was fun and familiar to the students, according to interpretations from observations and student anecdotal records. When self-confidence was rated for Lesson 5, the percentage rose. Lesson 5 was the most difficult and frustrating for the students, with a large number of them ending the class period short of lesson completion. When students returned for Lesson 6, they wanted to go back to Lesson 5 to finish their projects. The students scored a lower percentage on self-confidence for the last lesson. Lesson 6 proved to be engaging for the students, and confidence rose during the lesson, but it was not indicated in the journals numerically. Journal entries contained comments such as, "That was neat," "Lesson 6 was cute," and "It was easier than I thought it would be."

In analyzing my perceptions of student confidence, I used external indicators that the student exhibited self-confidence. I looked for cooperation, positive outlook, and persistence with the task. Most of the students came in pleasant, ready to work, and focused on the lessons. Facial expressions and other non-verbal forms of communication conveyed confidence to me more often than reticence or rebellion indicated lack of self-confidence. One student was openly rebellious of participating in the unit. Since this behavior is typical for the student, it couldn't be ascribed specifically to a lack of self-confidence in her ability to successfully participate. The rebellion may indicate an overall lack of self-confidence in any academic tasks. This student followed along with the lesson and browsed the website containing the multimedia, despite the fact that she did not do any of the practice or formative assessment activities.

Student confidence in their abilities to create a research project dropped significantly. The pre-intervention research assignments consisted of links to websites and material that was copied and pasted. Very little, if any of the project was original or organized into a research project. Perhaps the most significant outcome of the multimedia unit was the students' realization that the projects they had created in the past were not truly research projects. Once the students learned the characteristics of a quality research project, their confidence in their ability to create one fell. I believe this lack of confidence was emphasized by the difficulty posed by the multimedia unit presented in six days. The lack of depth in each lesson served to enlighten the students to what was involved in each step of the production, but it did not provide the time and substance to increase the students' skills.

The anecdotal notes from the student journals were brief. Initially, it seemed the students wanted to include statements that would please me, or say what I wanted them to say. The comments consisted of "It's OK," "This is fun," and "Nothing to say." After a few days, they began to understand that I wanted honest answers and their personal appraisal of the lesson. Students began to vocalize that they'd like more time and detail with the individual lessons. My opinions, reflected in the Teacher Journal, corresponded with the students' opinions in this domain. The lessons were rushed and superficial. Questions remained unanswered, leaving a gap for the next lesson. With the level of detail and practice in the lessons carried out on a daily basis, the students were not able to internalize the use of the 6-step procedure for completing a research project, although exposure to the procedure did appear to increase the quality of their research projects.

The middle school regularly uses KWL charts as study guides for the students. This is a tool with which the children are familiar. The students who chose the rock cycle for their project consistently entered facts about rocks and the rock cycle that were a part of their repertoire. Regardless of the topic chosen, the level of the student, or the number of explanations, the KWL chart was completed based upon the chosen topic rather than the 6-step procedure. I assign the persistence of this error to a lack of understanding of the overall goal of the unit.

When the students determined the 6-step procedure was the goal of the unit, they had questions that were not answered within the multimedia unit. As I answered questions, the work became less multimedia based and more teacher-facilitated. In my opinion, this decreased the validity of a study that asks if a particular multimedia unit is effective.

In Lesson 4, the students were allowed to choose from a software program to develop a writing web, a word processor to create an outline, or index cards for a more traditional approach to note-taking and writing organization. The specific software program was familiar to the students. The program was popular with the students who had shown enthusiasm for it in the past. A majority of the students chose the web and were successful in completing an acceptable web. The success of Lesson 4 would seem to be specifically credited to the use of the software program.

A few of the students completed a research project, although some were under the impression that they completed the task by finishing a web. Additional time would be necessary to effectively complete a research project during Lesson 5. Perhaps this multimedia unit would be more effective if developed for several weeks rather than several days. Particularly with students with special needs, teacher mediation and facilitation of the unit is more than beneficial. Teacher facilitation of multimedia instruction is supported by current research. Perry (2003) concluded that teacher intervention is necessary to individualize presentation, provide motivation, and compensate for missing prior knowledge.

Any generalizations from this research should be avoided for myriad reasons. The multimedia development may be deficient, thereby affecting the outcome of the research. Extraneous factors, including dynamics and issues of the participants, could affect the outcome. Technical issues, varying skill levels, such as reading and learning styles, and other inevitable differences present significant variables in the research. Teacher-student relationships affect engagement in lessons, which in turn affect educational outcomes (VanDeWeghe, 2006).

A multimedia presentation format will be developed to share findings of my action research. The administrators and teachers, as primary stakeholders in the outcome of the action research, will view the presentation at a staff development session. The multimedia presentation will be posted to my Valdosta State University homepage and will be accessible by professors, colleagues, and other students with an interest in the action research.

Looking to the future, information literacy is a highly essential skill in our information-rich society (Abilock, 2004; Plotnick, 2000; U.S. Department of Commerce, 2003). The ability to compile information into a useful form is a developing, evolving skill that requires a different approach to teaching literacy than in the past (Looney, 2005; The Edutech Report, 2006). Teachers will be required to carry a more technical spectrum of skills to capture the attention and adequately educate future generations of students (Williams, 2003).

Students with special needs benefit from instruction that includes multimedia presentations (Blair et al., 2001; Coleman-Martin, Heller, Cihak, & Irvine, 2005; Kemp, 1997; Gardner & Edyburn, 2001; Gardner et al., 2003; Mechling et al., 2003; Okolo, 2000). Multimedia may possibly be the mode of presentation that is most effective in teaching information literacy skills to students with special needs, but further research is needed to support that statement.

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