

# Teaching Information Literacy Skills Using Computer Assisted Instruction

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**Abstract:** The purpose of this study was to evaluate the effectiveness of an interactive multimedia tutorial followed by a classroom teacher-led practice session on student skill in and attitude toward one component of information literacy skills - locating and accessing information. The teacher's experiences and attitude in relation to this tutorial were also studied. This research was conducted using two average ability, ninth-grade language arts classes. The results of the study indicated that computer assisted instruction is an effective method of delivering information literacy skills instruction. Students were able to select an appropriate database for their topic and navigate through, select, and print information that supported their focus questions with minimal involvement on the part of the teacher. Since the tutorial/practice model proved to be effective, additional modules will be developed to support teacher-led information literacy instruction. This model more thoroughly integrates information literacy skills into the curriculum and solves the logistical problems of media specialists teaching all students.

## Introduction

During the past two years, I, as a media specialist in a rural/suburban Georgia high school, have witnessed many students coming into the media center unprepared to conduct meaningful research using the computer. Generally, they enter the media center, sit down at a computer and type something to the effect of "www.teen pregnancy.com" in the address line of the browser. They seem to think such a strategy constitutes a general web search. Too frequently, I observe students printing out information of questionable validity, such as a thread on a message board posted by "Big Daddy 9" just because the descriptors they typed in returned such a document. Oftentimes, I see students walking away having found no information because they have not yet learned how to select and type in the appropriate descriptors that would yield information on their topic. Overall, I see students wasting the limited class time allotted in the media center in inefficient or unsuccessful attempts to find information on the Internet.

As I looked at these problems systematically, it seemed apparent that there were two reasons students were unable to locate appropriate information to address their research questions: 1) their lack of information literacy skills, and 2) their teachers' lack of information literacy skills. The second reason is as important as the first because it inhibits the teachers' ability to teach these skills to the students.

Included in the roles and responsibilities of the media specialist in Georgia is for the media specialist to work collaboratively with the language arts teacher to teach information literacy skills which are written in the Quality Core Curriculum (Georgia Department of Education, 1999). Unfortunately, the majority of our language arts teachers are not comfortable with teaching research skills using electronic media, and so the teacher relies totally on the media specialist to teach these search and retrieval skills, which require two days instruction per class. Although it is possible for the media specialist to meet with each class for the (at least) two sessions required, it is at the expense of providing adequate media services to other teachers and students and completing routine tasks in the media center. Furthermore, this would not be the best way to teach information literacy. We know that material to be learned is better taught in context, not as a separate entity (Todd, 1995).

## Review of the Literature

Several institutions, particularly in higher education, have already designed effective instruction using electronic media to orient students to library facilities, resources, and the use of resources (Cherry, 1991; Turner, 1990). Cherry compared a control group receiving traditional lecture instruction in the OPAC with a treatment group receiving computer assisted instruction (CAI) and found that CAI is as effective as the traditional lecture method.

Turner (1990) finds CAI particularly useful where instructional needs are large scale or ongoing, and especially in teaching computer related skills.

A well-designed, although not formally evaluated, on-line tutorial is the Texas Information Literacy Tutorial (TILT) published by the University of Texas (1998). TILT is divided into three interactive modules, each consisting of an introduction, a list of key concepts and skills one will learn while working through the module, the text of the lesson, and a quiz. On-line tutorials have also been created for teacher in-service in the K-12 setting. Bellingham Public School System (1999) created a tutorial divided into 16 modules on topics ranging from defining information literacy to the ways we gather information to connecting globally using telecommunications and mail. Although there is no evaluative data documenting effectiveness, the site is well-designed, user-friendly, and methodically covers all areas of information literacy skills.

A review of the literature shows that computer assisted instruction can be an effective vehicle for student motivation and learning (Kulik, Kulik & Bangert-Drowns, 1985). One study indicates that CAI motivates students because it offers them choices and control over their learning (Cotton, n.d.). A meta analysis by Kulik et al. also supports the effectiveness of CAI on motivation and attitude, finding that computer-based instruction in 22 studies improved attitude-toward-instruction scores. In addition, several studies indicate that student learning rate is faster with CAI than with traditional instruction (Rupe, 1986; Kulik, et al., 1994). Not only is it indicated that students learn faster, but it is also suggested that they retain the information longer (Kulik, et al, 1985).

After examining studies on the success of library instruction using CAI, I came to the conclusion that a well-designed multimedia tutorial would be a useful and effective tool for teaching various components of information literacy skills in my school. For this study, my focus was limited to location and access skills with students in my high school.

## **Method**

### **Participants**

This action research was conducted at a rural/suburban high school in Georgia, located approximately 35 miles from Atlanta, that serves a student population of 1,780 with 118 faculty members. Student demographics reflect a population that is sixty-three percent Caucasian, 33 percent Black, two percent Hispanic, and two percent Asian, American Indian or multi-racial. Twenty-five percent of our students live below the poverty level. Forty-eight percent of our students are involved in a college preparatory program of study. The participants for this study were students in two intact, average ability, ninth-grade, language arts classes of 22 and 24 students taught by a single teacher. The classes met, respectively, during the first and second periods of the day.

### **Intervention**

I designed and implemented a hypermedia interactive tutorial to introduce ninth grade students to GALILEO (<http://www.galileo.peachnet.edu>), the wonderful on-line library system provided by the State of Georgia. The tutorial specifically dealt with how to locate and access information using the EBSCOHost periodical databases within the Galileo system. The tutorial, created with PowerPoint, consists of 60 audio-narrated, animated slides and demonstrates how to attach to GALILEO, and how to enter EBSCOHost databases. It explains the purpose of three of the EBSCOHost databases then teaches the student how to select the appropriate database for the topic, how to choose appropriate descriptors for their search by using Boolean operators, and how to navigate through the database. Students had hypertext access to definitions of unfamiliar terms throughout the tutorial. Intermittently, students reviewed the material presented. If the student selected the correct answer, he advanced to the next section of information. If an incorrect answer was selected, the tutorial was programmed to automatically repeat the last material presented.

In order to judge whether the tutorial was effective, I posed the following research questions:

1. When instructed to locate magazine articles that addressed their topic, would students access GALILEO as a first step in their search for information?
2. Would students be able to locate information addressing research questions using the databases in EBSCOHost?
3. Would their knowledge transfer to searching in another database?
4. Were students engaged in finding information using these databases?
5. What did the classroom teacher experience during this intervention?

## **Pre-Intervention**

During the first week of school, I worked collaboratively with the teacher to formulate a list of research topics and focus questions for each topic. Each of these topics was currently being covered heavily by the news media, e.g., stem cell research, environmental problems, human genome research, cloning, problems posed by illegal immigrants, etc. In order to address these topics, students needed recent, general information; therefore accessing GALILEO and retrieving information from the magazine and newspaper databases would likely yield the most current and authoritative information that addressed each. In preparation for the study, students were given consent forms that both they and their parents were to sign and return to the teacher.

Several days before the intervention, students selected a research topic from the list formulated collaboratively by the teacher and me. The teacher gave each student a sheet on which he wrote his selected topic and specific focus questions that would guide his research. Prior to the intervention, the teacher worked through all aspects of the pre-research process with them, so that when the intervention began, they had a list of focus questions for which they knew they must find information.

### **Day One: Tutorial and Performance Assessment**

On the first day of the intervention the students would go through the tutorial and then show what they learned by finding an article. I collected data by observing the teacher's interaction with the class and through a performance assessment of the students' work.

The teacher took each class to the computer lab and distributed the handouts that stated the student's name, topic, and focus questions. She gave them a handout that stated instructions regarding what they were to do after working through the tutorial, introduced the lesson, and directed the students to begin the 20 minute tutorial.

### **Day One Results: Did the Tutorial Work?**

During the tutorial, all students remained engaged in the task with two exceptions. Two computers during the first period froze early in the presentation, and the teacher had to move two students to other computers. They began again and were able to complete the assignment. After the students finished the tutorial only two asked, "Now what do we do?" The teacher simply responded with, "Follow the directions on your instruction sheet." The students, unusually quiet for a ninth grade class, followed the instruction sheet, and all but two students managed, without any assistance, to enter GALILEO, navigate to and select the appropriate database, find an article that addressed their topic, print it out, and turn it in according to the directions. The two students who needed assistance had typed in the GALILEO URL incorrectly. The teacher pointed out their error, and they retyped correctly. During the practice session, the teacher circulated about the room, ready to help; however, the students worked well without any other assistance. The only confusion on this day occurred at the printer when students tried to retrieve their articles. We heard a lot of, "Is this yours?" and "Where's mine?" or "I think that's part of mine." When this confusion began, the teacher went to the printer to make sure that the students received their own article.

At the end of the day, the teacher and I examined each student's work to determine if the article printed supported the topic. The teacher was pleased that each student in both classes navigated through the site successfully and managed to find and print an appropriate article. We looked forward to the next day to see if students would remember and apply the steps they learned.

### **Day Two: Can They Repeat What They Learned?**

On the second day the students were to apply what they had learned the previous day by locating and printing an article that addressed one or more of their focus questions. Data were collected during the second day by two people, a teacher taking field notes as she observed the experiences of the classroom teacher, and me using a student engagement observation instrument to record time off task. I initially observed one student then circulated around the room to observe others. In addition, I assessed their performance by examining the articles the students printed to determine if they had been able to navigate the database, find and select an article appropriate for their focus questions.

On this day, the teacher re-distributed the previous day's sheets that stated student topics and focus questions, then took the students to the computer lab. After settling the students at computer stations, the teacher distributed highlighter markers and instructions for the day's assignment. Students were to print out at least one article that addressed one or more of their focus questions, highlight the sentences that answered the focus question and write the number, that corresponded to their focus question, in the margin.

### **Day Two Results: Did What They Learn Transfer?**

Although all students appeared eager and began their assignment without hesitation, this day did not go as uneventfully as the first. Several students had difficulty. Seven students mistyped the URL for GALILEO. When the students raised their hand for help, the teacher went to them, checked the URL they had typed in, and pointed out their mistake. They retyped the URL and began navigating. Several students neglected to check the box that would return only "full text" articles. The most significant observation was that six students in each class had difficulty

selecting appropriate descriptors to type in the search box. I also noticed six students typing the focus question in its entirety, for example, "Why do the Muslim terrorists hate the Western World?" Both the teacher and I had to remind these students to select only the key words in the focus questions and connect those key words with the Boolean operator "and." After retyping more targeted descriptors and using "and" between descriptors, the menu of articles returned addressed their focus questions. During the search for information, no student disengaged from completing the assignment. Additionally, it was rewarding to see that nearly all students were first reading the abstract of the article to determine the article content before clicking on the "Go to Full Text" button as had been suggested in the tutorial. Only a few minor lapses being "off-task" were noted and those were students who checked periodically with the classmate next to them to observe how they were doing but returned to their own search after a few seconds. As students found a relevant article and printed it out, they retrieved it and followed the remainder of the directions, turning their assignment in to the teacher at the end of the period. To avoid confusion at the printer, the teacher made sure all sheets of an article were together and handed it to the student to whom it belonged.

In reviewing their day's work, I found that all but seven students had located articles that addressed one or more of their focus questions. Those seven did print out an article; however, it was only vaguely related to their topic. Although those seven highlighted many sentences, none related to addressing their specific focus questions. The teacher assured me that these were her problem "leisure learners" who try to get away with doing as little as possible.

#### **Day 7 Student Skills Performance Observation/Interview**

A week later five students were selected to repeat finding an article to support a given topic using GALILEO then see if they could transfer their knowledge to searching an unfamiliar database. I collected data by formal observation/interview. Although there were initially 10 students selected, absenteeism and time constraints allowed for only five interviews. These five reported to the media center, individually, before school, during their fourth period study time, and after school over a period of three days.

Each student was asked to locate an article that addressed the research question, "How is virtual reality technology being used to help handicapped people?" and print out the article. The URL of GALILEO was prominently displayed on the top of the computer. Each of the five students typed the address in the browser, and navigated to the appropriate EBSCOHost database. Four students used the descriptors "virtual, reality, technology, handicapped," separating each with the Boolean operator "and." The other student chose to omit the word "technology." One student neglected to check the box that indicated "full text only," but realized this error when he started looking for the full text of the article and found it not offered. He thought a moment, clicked the "New Search" button, re-entered the descriptors and checked the "full text only" box. Each of the five, without assistance, found and printed out an article that addressed the research question.

Next, the I asked them to return to the home page of GALILEO, but this time select the ProQuest database for general periodicals. As they looked at the unfamiliar ProQuest search screen, I offered them the following analogy. "Searching an unfamiliar database is just like driving an unfamiliar automobile; however, they all drive alike. You know there is a forward and reverse somewhere, a steering wheel, and some way to roll the windows up or down." Then they were told to find an article that addressed the same question as previously. Each observation/interview lasted approximately 15 minutes.

#### **Day 7 Results: Did the Knowledge Transfer to Using a Different Database?**

Each student studied the options on the search screen, even using the "pull down" menus before making his selection. Two students were hesitant to press the search button after typing in the descriptors and selecting their options. I asked them to tell me what they were thinking, and both students said that they were afraid that they would be wrong. I explained to them that there was no "wrong," and if they were unhappy with the result they could do it again and again until they were satisfied with an article for their question. This response appeared to put them at ease. I was delighted that all five of the students printed an appropriate article within three minutes.

After his performance, each was asked for an honest response to six questions. From their answers I learned that they much prefer finding information using the databases available in the GALILEO system because they found it to be a quick and easy way to find reliable information. The four students that had used the Internet previously to find information by doing a general web search said that they rarely found what they were looking for and wasted a lot of time. Additionally, they stated that they learned a number of things from the tutorial such as the terms "database," "periodical," "Boolean Operators," "descriptors," and the difference between a periodical and a journal. When asked if they would have preferred several handout sheets of step-by-step instructions rather than working through the tutorial, they all replied that they much preferred the tutorial, indicating that they thought it was a better way to learn because they learned more quickly if they could "see it," work at their own pace, and repeat information if they needed to. They also expressed that they liked the review questions after different sections because it confirmed that they understood the information presented. Two of them stated that they had to repeat a

section because they clicked on an incorrect answer during the review; however, they got it correct on the second try because they paid closer attention when the information was presented the second time. The final question asked if they had needed help from their teacher at any point during the two days. Four students said that they had not needed help with anything. Only one responded that he had asked assistance from the teacher on the second day when he had typed in the GALILEO address incorrectly. He thought there was something wrong with the computer because the screen stated that the page could not be displayed. After typing in the correct address, he stated that he did not need any other help.

### **Teacher Interview**

An interview with the classroom teacher produced positive feedback regarding her experience during the two days. She stated that she was impressed by student engagement on both the days and that remaining on task for nearly an entire period was unusual for ninth graders. She attributed their engagement to the fact that it was a “hands-on” activity, it was something that they really wanted to learn, and they could absorb the information at their own pace. She felt that this tutorial was well designed and would use it again for other classes. The only difficulty she observed was students not typing in appropriate descriptors in the search box. We decided that several more slides showing different research questions and indicating the keywords in the question should be included in the tutorial. She equated the students’ difficulty in selecting keywords for their search to their difficulty in identifying the main parts of a sentence or the main idea in a paragraph. She felt that knowledge gained during these two days was time well spent, for she felt that students learned what GALILEO was and the resources available to them through GALILEO, what Boolean operators do, how to navigate through EBSCOHost to find articles, as well as learning the meaning of terms such as periodical, database, and journal. She said that she would like to see other PowerPoint tutorials created to explain search engines and web site evaluation techniques.

## **Conclusions and Implications**

As with any action research study, prudence must be used in interpreting the results, for what people say during interviews and how they act during observation may not apply to their future actions; however, the initial data are encouraging.

- One week after the intervention when students were asked to locate an article on a current topic, students accessed GALILEO as the first step in their search.
- Students navigated to EBSCOHost, located an appropriate database, found and printed out an article to support their research question.
- Their knowledge of searching an EBSCOHost database transferred to navigating through another database with a completely different appearance.
- Students remained actively engaged during both the tutorial on the first day and during their search for information on the second day.
- The classroom teacher appeared to be, and reported being, very comfortable during the practice session on the first day and during student research on the second day and stated that she looked forward to delivering additional lessons in this manner.

From my research I learned that teachers are likely to introduce a unit of instruction they know little about if they are given a good tool for presenting it, and the tool has proven successful for student learning. This exercise reconfirmed that students “learn by doing” and the students appeared to enjoy learning by this method. Having received such positive feedback from the teacher and the students involved, as well as other teachers who knew of this project, I know that time spent in creating tutorials for teaching information/library skills will not be wasted, but will be used by various language arts faculty. The teachers are being encouraged to incorporate technology into their teaching and this tutorial will support them in accomplishing that.

While additional research over time is needed to determine the long-term impact of what the students learned during the tutorial, practice session, and second day research, the initial findings regarding the use of a self-paced, interactive, multi-media tutorial appears promising. My plan now is to create other tutorials on conducting Internet searches and evaluating web sites so that teachers will have more ready-made teaching tools at their disposal.

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