Has The Internet Improved Medical Student Information Literacy Skills?

A Retrospective Case Study: 1995-2005

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BACKGROUND

Each year Jefferson Medical College accepts roughly 230 new medical students. Over the past decade, the Scott Memorial Library has asked students to complete a pre-test of information literacy skills at the start of the semester for our Clinical Information Systems course (Jan Plan, later named MP21). At the end of the course the students complete a post-test so we (Education Services), and they, can see the changes in their performance. This poster presents some of our findings over the past decade--a time when computers and information access has greatly increased.

Two of the learning objectives defined by the Medical College relate directly to the Clinical Information Systems course.

> "The ability to retrieve (from electronic databases and other resources), manage, and utilize biomedical information for solving problems and making decisions that are relevant to the care of individuals and populations."

> "The ability to critically evaluate the medical literature and to seek opportunities to expand understanding and appreciation of scientific discoveries and their applications."

To operationalize these goals we have constructed several case studies that guide and model appropriate use of the clinical information systems available at Jefferson. While using the case studies, we require students to:

- List potential information resources
  - Identify the most appropriate information resource(s)
  - Construct and execute the search
    - Utilize the resource specific language & restrictions
    - Refine as necessary
- Evaluate the search results and select those most appropriate
  - Summarize the main concepts
  - Analyze appropriateness for current patient or situation
  - Articulate and apply results

The JMC Medical Informatics course was created in 1987 to address the increasing rate of information relevant to practicing clinicians. It was taught in the traditional lecture format until 1995 when the World Wide Web made it practical to roll out interactive, online educational programs. So we will begin our review in 1995, the first year we built several interactive case studies that the students use to learn how medical information systems are used every day in clinical practice. These cases have the students follow a virtual preceptor - very similar to the way our students get early exposure to the practice of medicine during their first year when they get matched with a real physician and spend the day with them.

As the case study progresses the student is sometimes asked to research a question asked by the doctor, and sometimes by the patient or patient's family members. From the need to answer the question we build interest in learning about the various medical information systems available. Combining hands-on workshops and self-directed learning help aids, students learn how to use a variety of information resources and in doing so answer the case questions. Sometimes the case answer can be scored automatically by the content management system, other times search strategies require review by the library staff.

OBJECTIVE

Our goal in this investigation was to see if the popularity of the Internet has had an effect on searching skills and an increased awareness of where to search for appropriate medical information.

METHODOLOGY

First year medical students from Jefferson Medical College were asked to complete a pre-test at the start of semester. Once the course began, students were required to complete a series of tutorials about various medical information systems including the Scott Memorial Library, MEDLINE, MICROMEDEX and other resources. In addition, the students had to attend a mandatory hands-on workshop, complete 3 online case studies, and a post-test. The case studies prompt the students to demonstrate proficiency in using the medical information resources and serve as a self-assessment tool for them to evaluate their skills using the medical information systems. Our research question is, have fresh-

men medical students' information searching skills improved in the past decade? We will answer this question by comparing the pre-test scores from students' in this year's class with those from 1995.

RESULTS

Table 1 1995

Pre Test		Post Test	
Mean	39.26	Mean	80.85
St. Dev	12.27	St. Dev	12.59
n=	229	n=	229

Table 2 2005

Pre Test		Post Test	
Mean	62.76	Mean	79.25
St. Dev	14.26	St. Dev	9.18
n=	176	n=	98

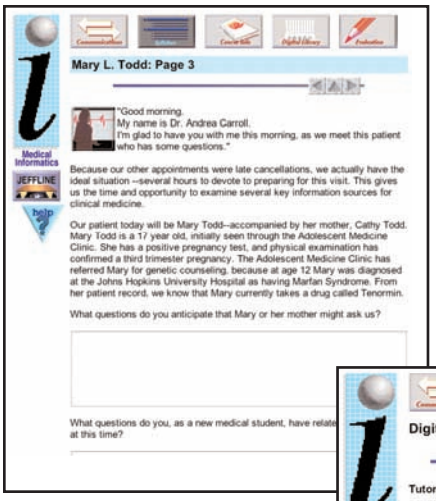
A t-test was used to determine if the change in pre-test scores in the past decade was significant, or potentially random difference. Comparing the pre-test means of both groups (1995 vs 2005) indicates a significant difference ($t=17.80$ $p>0.0001$) exists, and these results are not likely to have happened by chance alone. Similar t-test evaluations confirm a significant difference between pre-test and post-test events (1995: $t=35.80$ $p>0.0001$; 2005: $t=10.31$ $p>0.0001$).

CONCLUSIONS

As you can see, student means on the pre-test have improved (a significant difference was found). Unfortunately, the scores are still low considering how proficient students claim to be on finding information. We believe the difference lies in how easy it is to search for information on the web versus how easy it is to find appropriate, authoritative information for health care.

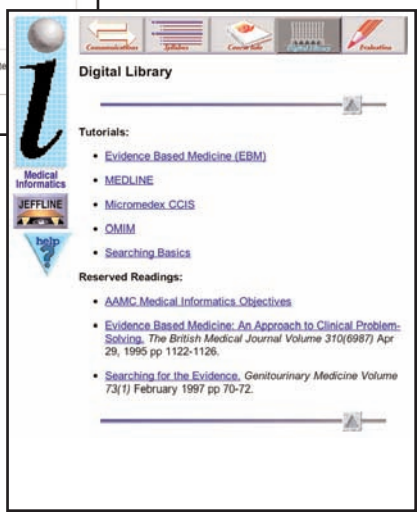
Medical students seem to be transferring their confident web skills to searching the medical literature. The data supports that they are not adapting to searching knowledge based resources in comparison to online resources they are accustomed to using on a daily basis such as Google etc. Internet searching proficiency alone has not improved medical students medical information literacy skills. Mixing in targeted literacy instruction including hands-on, online tutorials and handouts have helped medical students improve their scores. Medical students are slowly realizing how different medical research can be compared to their daily online research.

1995



INTERACTION SCREEN

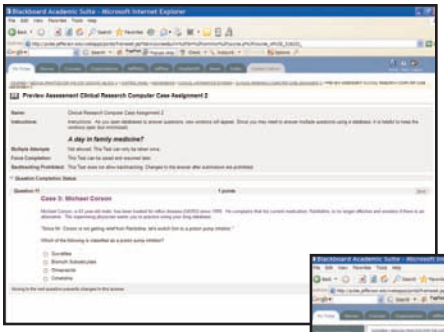
Combination of hand-written HTML linked to an Oracle database



DIGITAL LIBRARY

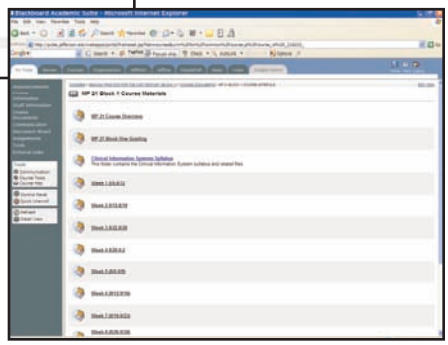
Sample of our "digital library" where support files were stored. Though commercial learning management systems make constructing web content very easy, we've found the imposed design constraints far less attractive.

2005



INTERACTION SCREEN

Now built as "tests" inside the Blackboard learning management system.



DIGITAL LIBRARY

Reference Documents (similar to the Digital Library in 1995)

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