# Journal of EAHIL

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## Award for the Best First-Timer Oral Presentation

## Keeping students engaged by simulating continuing medical education

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**Abstract**
*The objective was to convert a paper-based seeking and evaluating evidence assignment to an interactive electronic format. In addition, the aim was to increase medical student engagement with the assignment by simulating a continuing medical education environment that many students will encounter in their future medical careers. The College of Family Physicians of Canada's ePearls™ continuing medical education environment was adapted for use as a student assignment and embedded in the medical school's learning management system. The assignment was delivered during the transitional course that bridges students' pre-clinical and clinical experiences. All of the students had completed a similar paper based assignment within the previous two years. Students completed the interactive electronic assignment during class time. At the end of the session, students were asked to complete an electronic survey which was designed to measure their preference for the paper or electronic delivery of the assignment and whether or not the delivery in the context of a continuing medical education environment was engaging for them. 42 of the 155 students who completed the assignment also completed part or all of the online survey. Most respondents perceived the introduction to the continuing medical education environment as being helpful (86%, n=40) and expressed a preference for doing the assignment in the online format (86%, n=42). Comments indicated that students valued its clinical relevance and the opportunity to immediately practice what they had learned while still having guidance at hand. Based on these results, the Library and CHE will collaborate together to deliver subsequent information literacy instruction in this format.*

*Key words:* computer-assisted instruction; information literacy; Evidence-Based medicine; medical education; undergraduate education; continuing medicine.

### Introduction

At the University of Alberta, undergraduate medical students are introduced to evidence-based medicine (EBM) concepts and skills at several key stages in their program. Medical librarians from the John W. Scott Library play a significant role in supporting the development of students' searching and appraisal skills as part of the overall information literacy training provided to students. One avenue of instruction has focused on practicing these skills during the transitional course that bridges students' pre-clinical and clinicaltraining. In the past, students have completed a paper-based "seeking and evaluating evidence" assignment. Feedback indicated that the assignment was perceived as being useful but slightly repetitive and not very interesting. In the summer of 2010, the library partnered with the Centre for Health Evidence to develop and pilot an interactive online version of this assignment. The project focused on increasing student engagement by simulating a continuing medical education environment that many students will encounter in their future medical careers.

Evaluation and assessment of the assignment focused on the following questions:

- do students find the introduction to a real-life continuing medical education environment valuable?
- does an interactive online assignment improve student engagement with the content?
- do students prefer receiving EBM assignments through electronic delivery?

### Literature review

Many studies have investigated the efficacy and benefit of using interactive tutorials for information literacy training, both broadly and in the health sciences.

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Systematic reviews on computer-assisted instruction in general have found that it is equally effective as traditional instruction, although the literature is characterized by a varietyof methods and assessment processes(1-2). Blummer & Kritskaya conducted a literature review of online tutorials and identified the following best practices for engaging learners (3):

- *employ active learning strategies − offer opportunities for problem solving, simulation, manipulation of screen, and quizzes. Incorporate a two-window design (one for instruction and the other for users to practice);*
- *remain relevant − ensure instruction supports course assignment;*
- *consider design − provide educational objectives, learning outcomes, and major points;*
- *use clear navigational techniques−highlight student's position in a tutorial and allow userto enter and exit the tutorial at any point;*
- *promote flexibility −allow for different learning styles and levels with branching, the use of modules, and different layers of content;*
- *provide access to a librarian.*

There is also a body of literature on the use of online tutorials in health sciences libraries. Anderson *et al.* conducted an analysis of web-based tutorials offered by academic medical libraries in the United States, and discovered that a majority were developing tutorials on common topics such as Ovid MEDLINE, PubMed and Refworks, but very few incorporated interactive elements(4).

Grant & Brettle created an interactive tutorial teaching MEDLINE search skills to Master's and PhD students in health sciences programs and found that it improved search skills and student response was very positive (5). Tuttle *et al.* reported similar results with their PubMed tutorial delivered to pre-clinical medical students (6). Anderson & Wilson compared an interactive tutorial to a passive video tutorial using a pre- and post-test and found that learning outcomes were similar in both groups but students perceived the interactive version to be more useful (7).

The authors are unaware of any literature that has explored using a simulated continuing education environment as a method of engaging undergraduate medical students in information literacy, either online or in the classroom.

**Methods**

The Centre for Health Evidence (CHE) is a non-profit organization that provides a range of information and communication services to support the learning, teaching and practice of evidence-based health care. CHE has collaborated with the College of Family Physicians of Canada to develop the ePearl online continuing medical education environment, used widely by practicing family physicians *(Figure 1)*. The ePearlprogram was adapted for use as a student assignment and embedded in the medical school's learning management system, HOMER.
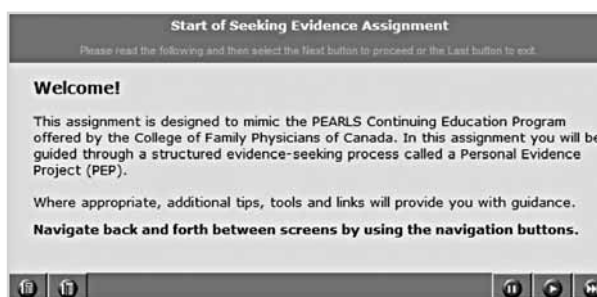


**Fig. 1.** *Welcome screen of the evidence seeking assignment.*

This assignment was designed around the health information cycle *(Figure 2)* popularized by the *Users' Guides to the Medical Literature* (8):

- **assessing** an initially disorganized information mix in order to recognize and detect important patient problems;
- **asking** relevant questions that suggest an appropriate source of information and are specific enough to facilitate an efficient search for evidence;
- **acquiring** the most important evidence from an ever-expanding health literature;
- **appraising** the best information to expose overt bias and variability; and
- **applying** useful, valid and important evidence while monitoring health outcomes to see whether the patient or population goals are achieved.
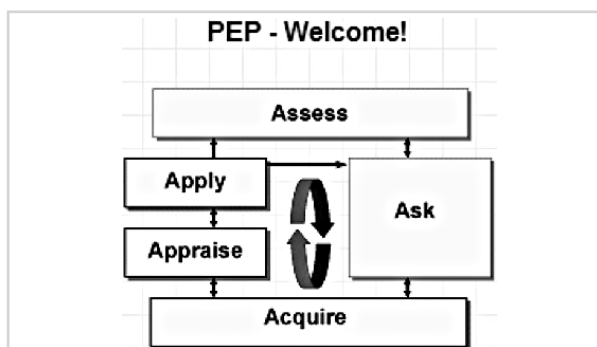


**Fig. 2.** *Health information cycle.*

Students completed the assignment during dedicated class time, immediately following a brief demonstration of MEDLINE searching. Each student was given a patient scenario and was prompted to identify a clinical problem *(Figure 3)*.
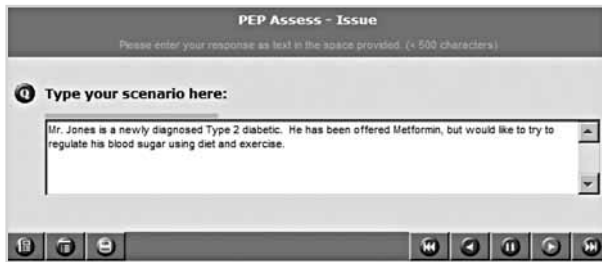


**Fig. 3.** *Describing the clinical scenario.*

The student then developed a focused clinical question using the PICO (Population, Intervention, Comparison, Outcome) framework (9). The assignment included a PICO building module, which automatically generated a clinical question based on what the student typed into each field *(Figure 4)*.
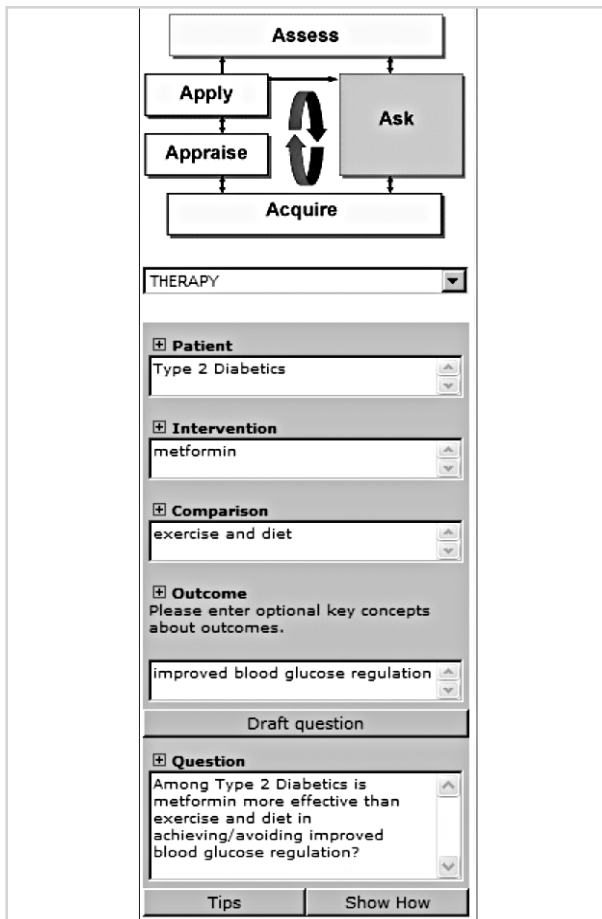


**Fig. 4.** *PICO Builder.*

As the students progressed through the assignment, they were linked to question-specific resources and tools that assisted in completing each stage of decision making. Responses at each stage were stored and used to generate a final assignment report suitable for submission. Assignments were assessed using the grading module of the HOMER learning management system *(Figure 5)*.
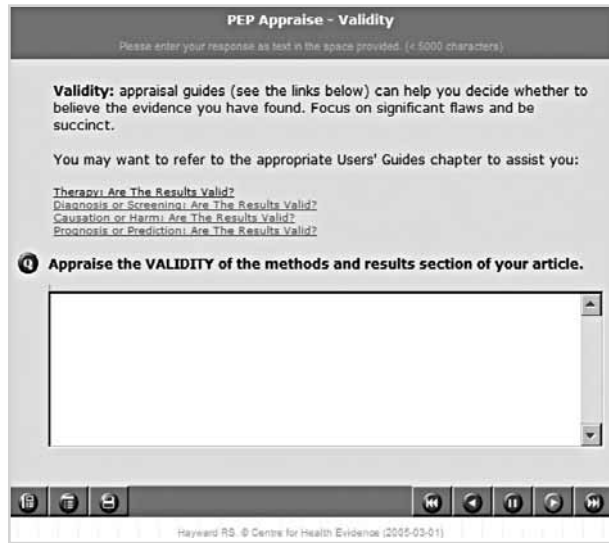


**Fig. 5.** *Linking to relevant resources.*

All of the students had completed a similar paper based assignment in the previous two years. At the end of the lab session, students were asked to complete an online survey which was designed to measure their preference for the paper or online delivery of the assignment; the ease of use of the paper assignment compared with the online assignment; and the extent to which they found completing the assignment in a simulated continuing medical education format engaging. Additional questions also collected information on the students' perceptions of their personal information competency prior to entering their clinical clerkship years, as well as their needs and preferences with respect to library instruction.

**Results**

42 of the 155 students who completed the assignment also completed part or all of the online survey. Most respondents perceived the introduction to the continuing medical education environment as being helpful (86%, n=40) and expressed a preference for doing the assignment in the online format (86%, n=42). 81% also believed that completing the assignment online was easier than doing the assignment in a paper format

(n=42). A majority of participants (86%) were in favour of moving more library assignments into an electronic environment similar to the one used in the assignment (n=42).

Three key themes emerged in response to the open-ended question that asked students to comment on what they liked about the assignment. In terms of the design of the assignment, students valued its clinical relevance and the opportunity to immediately practice what they had learned while still having guidance at hand. They also appreciated the structured step-by-step format and direct links to resources.Finally, students believed that the assignment provided them with an opportunity to learn to use medical information resources effectively given the time constraints of clinical practice. Student comments about what they liked included the following:

- it was quick, straight-forward and clinically relevant;
- I like that this was an opportunity to get an idea of what CME (Continuing Medical Education) is like. It made us have a better understanding about things we will actually do as physicians in the future;
- [t]hat an expert walked me through using the Medline database and we got to work on an assignment that applied what we just learned;
- links to excellent resources for appraising articles. Very well structured assignment helped to build an approach I will employ in the future when researching a given clinical question.

When asked about how to improve the assignment, many students wanted more class time to complete it, more descriptive patient scenarios, and to be given an example assignment in advance. Student comments about the improvements wanted included the following:

- the assignment ended up being a bit too long to finish in the computer lab, but I think that was mainly due to the fact that I went into a lot of detail when appraising the paper. It would be helpful if it was made a bit more clear how much detail we should go into;

- it would be nice if we could have a simulation of the patient interview/history/physical exam, to make the situation seem more realistic.

Several respondents mentioned encountering small technical problems related to usability and resource linking, which were subsequently solved. The largest problem was that students had a hard time accessing appraisal information, due to a limited number of concurrent licensed seats on the electronic resource *JAMA Evidence*.

Anecdotal feedback provided to the course coordinator indicated that students found this assignment more challenging than previous assignments, but they did not find it boring. Although the goal of this project was to increase student engagement, it is important to note that the quality of student work was comparable to or better than assignments from previous years.

## Discussion

The results suggest that the assignment was successful in increasing student engagement with the assignment and with information literacy. In addition to consolidating the students' learning about the health information cycle, the students appreciated the early exposure to a continuing medical education environment that they will end up using as practicing physicians. Students were also able to immediately practice what they had learned in a structured way, with easy access to required resources. This project also improved the assessment workflow for instructors by integrating the assignment in with the existing electronic grading system.

Survey questions and comments suggest that the assignment was successful because it simulated a relevant professional activity, and as a result, students felt that they were learning valuable skills. Maintaining relevancy was one of the best practices identified by Blummer & Kritskaya in their review of online tutorials (3). This assignment followed many other best practices, including: active learning techniques (through immediate opportunity to practice), a structured design and objectives (through using the health information cycle), clear navigation, and easy access to librarians.

There are limitations to these results. Most notably, they are not broadly generalizable because they only represent one class at one institution. There were also a low number of survey respondents given the overall class size. However, given the large number of respondents in favour of the new format and the anecdotal feedback gathered through librarian observation of the lab sessions and from the course coordinator, the authors consider this project a success.

## Conclusion

Overall, the new assignment was well-received. Based on these results, the Library and CHE will collaborate together to deliver subsequent information literacy instruction in this format. The assignment will also be integrated as part of a longitudinal curriculum that is being piloted with first and second year students in the upcoming year.

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