Blending e-learning with face-to-face teaching: the best of both worlds or just twice the work?

Elena Springall

1Gerstein Science Information Centre, University of Toronto Libraries, Toronto, Canada

Corresponding author: Elena Springall, elena.springall@utoronto.ca

Abstract
Introduction. Blended learning involves mixing traditional face-to-face teaching with online learning within a single course. The Faculty of Medicine at the University of Toronto is using this model of instruction more and more. The library that supports the Faculty of Medicine has been experimenting with blended learning for the past several years. Given the current trend in the Faculty of Medicine, the library is taking this opportunity to do a thorough examination of how well this approach works for information literacy education.

Methods. Conclusions are based on data (assignment grades, student evaluations) from two pilot tests in the information literacy curriculum of the medical school, and semi-structured interviews with colleagues in medical education colleagues.

Results and discussion. Blended learning has great potential for success in teaching medical students information literacy skills. Like any instruction, however, it needs to be carefully planned. Both in-person and online components must be thoughtfully aligned with learning goals and activities to provide added value to participants, and assessment should be done at each stage to ensure buy-in from students and measure success.

Key words: Education, medical undergraduate/mt; information literacy; librarians; computer-assisted instruction; models, educational

Introduction
The purpose of this study was to find a) a confirmation that blended learning is an appropriate method of instruction for teaching information literacy skills to medical students and b) what factors can influence the success or lack of success in a blended learning information literacy class.

Blended learning is defined as “the thoughtful integration of face-to-face and online learning” (1). Studies have found that students in blended learning classes have higher achievement than those in traditional or fully online classes (2) and others find that blended learning classes are with associated with higher student satisfaction than other modes of instruction (3). While much attention has been given to whether or not blended learning is effective in terms of learning outcomes, student and faculty satisfaction, there are still gaps in evidence and guidance on what specifically can influence the success of a blended class. Like traditional or e-learning classes, not all blended learning classes are created equal.
In this paper, I will endeavor, through an account of pilot tests and the advice of experts at my institution, to give recommendations for developing a successful blended learning class.

Setting
The University of Toronto is a comprehensive, public university in Toronto, Canada. The Gerstein Science Information Centre (hereafter Gerstein) is one of 44 libraries spread across three campuses and is the main library serving the Faculty of Medicine. Since 2010, the Hazel McCallion Academic Learning Centre has also served the Mississauga Academy of Medicine, where roughly one fifth of undergraduate medical students are located, while Gerstein provides serves the remainder, and provides leadership. There is also a long history of collaboration between the university and hospital libraries in teaching information skills to medical and health sciences students.

Methods
Pilot test – Transition to Clerkship
Pilot tests were carried out in the fall of 2013 as part of the library’s regular instruction in the Faculty of Medicine. The first of these was a collaboration between teaching faculty, clinical faculty, and the author as a teaching librarian. Transition to Clerkship (TTC) is a two-week course held at the beginning of the third year of medical school designed to help students transition from campus-based learning in the first two years of medical school to hospital-based clinical clerkships in years three and four. The component of the course we developed was branded as the Information Management Module. All online components were delivered through the course site on the learning management system (Blackboard).

The module was comprised of four steps. In the first step, students accessed a case history online, and had a firm 30 minutes to submit a treatment plan for the patient. Students subsequently completed a survey about the information resources used and their experience. Upon completion of the case and survey, students entered the second step and access to online instruction became available. This involved a series of videos including ones created by the author on point-of-care, evidence-based tools as a category, as well as walk-throughs of specific tools including Dynamed, UpToDate, LexiComp and PubMed Clinical Queries. At this point, in the third step of the module, students were assigned to groups of approximately eight students, given a case, and were tasked with coming up with a clinical question, using information resources to answer to their clinical questions and provide treatment recommendations as appropriate as a group. To present their results, students produced a PowerPoint with voice over, uploaded it to Blackboard, and then completed a peer evaluation of these presentations. The final component of the course was an in-class session in groups of approximately 50 to 100 students where instructors presented survey results from the individual cases, a discussion of making decisions and justifying them in cases of uncertain evidence, and effective group dynamics. Prizes were also awarded to the group whose presentation ranked highest according to the peer review. Students formally evaluated the in-class component but not the online component.
Pilot test – Determinants of Community Health II

In this year-long class, students work on a community based research project, with many smaller assignments leading towards their final product. One of these is the literature search assignment, which our instruction endeavored to prepare them for. Students were given access to an interactive online module (developed with Articulate Storyline) guiding them through developing a search question and performing a relatively comprehensive search in OvidSP Medline and Embase. Following completion of the module, in order to gain access to an optional in-person instruction session with one-to-one support with the search assignment, students were required to submit their search questions beforehand. This hour-long session began with an overview of common search pitfalls, then focuses on helping students with their unique searches. Search assignments were due two weeks after the scheduled in-person class and were graded by librarians. Passing this assignment was required for completion of the course. Students evaluated our intervention as a whole.

Literature review

Interviews

Semi-structured interviews were conducted with two key people in e-learning in the Faculty of Medicine: Wes Robertson, Director of Information Technology; and Marcus Law, Director of Academic Innovation and Deputy Director of Pre-clerkship.

Results

Pilot test – Transition to Clerkship

The online exercises and content were well received, based on verbal feedback from students. There were some issues with the load-time required to stream videos for a small number of students, perhaps due to the large file sizes with high-definition video. In class, students discussed their lack of comfort in working on a case, alone with no direction as compared to the group exercise after having access to instruction. Feedback for the in-class summary and discussion was not favorable. Students felt there was not enough new content or activity to justify the time.

Pilot test – Determinants of Community Health

Attendance to the in-class workshop was very poor. We have attendance data for 111 of 254 students enrolled in the class. Of these, 34 or 31% attended.

The assignments were incredibly varied in their quality. The mean of the students who attended class was higher than that of the ones that did not attend (78 vs. 72%, respectively), and a t-test found a trend towards a significant difference (p=0.088). Very few students encountered issues with the online module. Students who did come to class found it very worthwhile. The low attendance meant that these students received a lot of individual assistance. Student feedback for the assignment itself was poor but none of the comments were related to the mode of instruction. Rather, they were related to the requirement to use MEDLINE or EMBASE rather than students’ habitual sources of information, with which they felt comfortable and confident.
Interviews
The two interviewees support education in very different ways. Mr. Robertson and his staff provide IT support for both administration and instruction in the Faculty of Medicine. The Discovery Commons, led by Mr. Robertson, has been involved in e-learning in the Faculty of Medicine in varying ways and to varying degrees for many years (eg. assisting the author with the creation of her first video tutorials in 2009). In 2010 the need for e-learning in undergraduate medicine increased significantly with the opening of the university’s first distributed medical campus nearby at the Mississauga Campus. Leading up to this, the capacity for reliable lecture capture, videoconferencing, and self-paced learning was built up. With the use of lecture capture, whereby lectures are loaded on the learning management system on the same day as they are delivered in class, attendance in person has decreased to 30 to 60%.

The Discovery Commons staff have been assisting faculty to create an increasing number of online modules. For all interactive modules, Articulate Storyline is currently the software of choice for the Faculty of Medicine. Mr. Robertson very clearly sees himself as a technical expert and not a pedagogical expert but in his experience he has observed some best practices in online education: have a clear goal, and only two to three main messages per piece of content. For videos that are not interactive, they should be shorter than ten minutes. Interactive modules should still have a run time that is shorter than one hour, ideally closer to half an hour.

Dr. Law’s role in academic innovation involves new pedagogical approaches including but not limited to e-learning. The Faculty of Medicine is moving towards self-regulated learning where students can choose whether to watch a lecture on video or attend, as well as how much time they will devote to certain course elements, if any. This puts a lot of responsibility on instructors to plan the course in such a way that students are motivated to make progress and that the course elements flow well. Confusion can arise if there are too many instructional modalities and care should be taken that the mode of instruction matches the learning objectives, and appropriate assessment is used. For example, physical exam principles can be learned by video, but human-to-human observation and feedback is necessary to assess proficiency in many clinical skills.

Dr. Law also stated that it needs to be clear that course elements, whether in-person or online, are teaching core skills in order to make it a priority for them. Content must be highly curated to avoid duplication and all content should be eligible for assessment in order for it to be a priority for students.

Both Mr. Robertson and Dr. Law said that good planning of a curriculum or course requires the same elements regardless of whether the mode of instruction is traditional, blended, or fully online. As Dr. Law described, planners should start with the goal, then work backwards to develop a series of events leading up to that goal. Once the course elements are identified, then the appropriate mode of instruction can be selected.

Discussion
Both interviewees started the interview by saying they weren’t sure they were the right person to be talking to, and that they don’t consider themselves to be experts in e-learning. In my opinion, this is completely appropriate. My interviewees are experts on the technical side and the pedagogical side of education – neither one limited JUST to e-learning. Having a broader area of expertise gives them a better sense of perspective when bringing their respective skills to e-learning and blended learning. Both said that while blended learning has great potential in undergraduate medical education, it’s best to start with learning goals and activities and then match that to the appropriate mode of instruction rather than start with a mode and build content to suit.

In the pilot tests there were some elements of success and some definite learning opportunities. Ideally, the project would have been structured with a comprehensive literature search and interviews with experts preceding the pilot tests so they could be based on the evidence found in the preliminary steps. Logistically, it’s not always possible to follow the ideal path and that was the case with this project. Unfortunately for the students, this may not have provided them with the best learning experience this year, but there are a lot of lessons learned that will benefit future students that might have gone unnoticed had everything flowed perfectly.

For Transition to Clerkship, we learned that not all course elements require an in-person dialogue. The wrap-up session did not provide enough new content to justify student’s time at a stressful point of the year before they begin their clinical clerkships. Alternatives include online discussion boards that can be incorporated into the learning process, while students are completing their assignments or tests. Our goal was to get the students to express the difference in experience between working in a group with guidance about recommended information sources and process, versus working alone and with no instruction. This does not require a trip to campus and dialogue can be accomplished online. If it is a required course element, participation can easily be tracked in discussion boards in the learning management system. It could also be added into the presentation students produced, which would allow for dialogue among group members but not between groups.

In the second Pilot test – Determinants of Community Health – there was a lot of pressure from students to make the in-person workshop optional. We tried it this year since it had been a request in previous years as well, however it sent a message to the students that the content was not core. Some did not realize that the follow-up assignment was required, although there was much communication. A pre-assessment of search strategies would be a valid way to exempt students from the session, but it would create a lot more work for librarian graders who are already highly taxed, coping with approximately 250 students. It is hard to judge search skills accurately in an automated way. Being able to recite the steps in a good Ovid SP search is one thing, but adapting them to a difficult topic is a higher-level skill that requires effort to assess accurately. Also, in an effort to make the assignment relevant to students’ research, each assignment included a search on a unique topic, making accurate grading very time-consuming.
There was a trend towards significance in the difference in assignment grades between students who attended and did not attend the in-person workshop. It is tempting, since the difference is not actually significant, to do away with the human-resource intense in-person sessions but of the students who did attend, the time was felt to be an efficient way of working towards completion of the search assignment. By making the session required, all students can benefit from this efficiency.

In conclusion, blended learning, e-learning and traditional in-person instruction can all be of benefit in teaching information literacy skills to medical students. Starting with clear learning goals and distinct, assessable activities is key to making the correct blend of these modalities and this takes considerable thought, planning, and negotiation with faculty. Working in concert with pedagogical and technical experts can facilitate the best blend of online and in-person instruction and an effective delivery to students.