

Online Microscopic Anatomy Laboratory Courses – Including Virtual Microscopy Slides – at Western University

Opportunity

Five years ago, as Associate Dean of the Bachelor of Medical Sciences program in the Schulich School of Medicine and Dentistry at Western University in London, Kem Rogers explored the potential of web conferencing, using Wimba Classroom. As a response to the growing pressures on universities from reduced budgets and growing enrolment, he continues to incorporate the expanding possibilities of online learning technologies, tools, and bandwidth, to provide high quality, more accessible learning opportunities. In his current role as Chair of Anatomy and Cell Biology, he and his colleagues have been developing online laboratory courses in Histology, Human Anatomy and Neuroscience.

Innovation

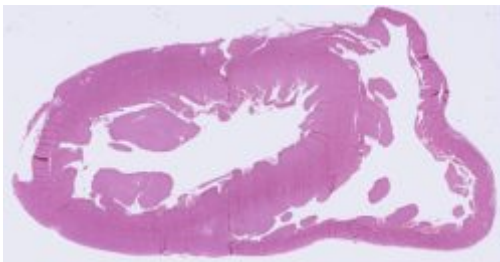
The first laboratory course to be delivered online was in Histology, the study of the microscopic structure of tissues. Working with Dr. Rogers, Michelle Barbeau, a PhD candidate, developed the online structure of the course and the slides needed for the online laboratory work.

Course Structure: Students in the full-year Histology course are in their third or fourth year of an undergraduate medical sciences degree. During the fall and winter session, they are offered the option of taking the course in-class or online, with a limit on the number of online students. As the courses are carefully researched to track the effectiveness of online as compared to face-to-face learning, the students are not allowed to change from the in-class to the online groups nor can the in-class group have access to the online archive of lectures. In the summer, the course is offered only in the online format. All students have access to online course information, including the PowerPoint slides, through the learning management system; only the online students have the link to the lectures.

- Using the Wimba Classroom web conferencing system, the face-to-face lectures are transmitted and archived so that students can participate synchronously with the face-to-face class and/or watch at their convenience.
- On their computer screens, online students see the lecturer, any class exhibits, and the PowerPoint presentations, including any additions made during the lecture. There is also space for communicating with the teaching assistant or instructor.

- A teaching assistant in the face-to-face class is connected with the online students and can bring their questions into the class discussions and ensure they hear all questions and replies. The instructor can also integrate polling questions with responses from both in-class and online students.
- The students in the face-to-face class have an additional three hour lab session. The online students have access to the same slide set as a virtual slide box, listen to a pre-laboratory talk, and submit online assignments within 24 hours of viewing the weekly laboratory talk. The instructor is accessible during the synchronous lab time and students can also send e-mails if they participate in the lab sessions asynchronously.
- Six online quizzes, with time restrictions, were scheduled throughout the course, to provide feedback and motivation, as well as contribute a small portion of the final mark. Mid-term and final exams are in face-to-face proctored environments.
- Students also have some synchronous group work and can use open up their own virtual rooms for studying and group work.
- The equipment to set up a classroom for online delivery is carried in a backpack and can be used in any classroom. It is assembled in the short period between classes from materials available in retail outlets. The HD video camera, the video signal convertor, microphone, laptop, and cables cost about \$1,500.

Virtual SlideBox: The 140 two-dimensional slides available to the students in the lab are scanned, organized, and made available to the online students. They can be magnified to appear as they would under a standard microscope. The slide box is also available to the face-to-face students and is available online as an [open educational resource](#).



Slide of the heart

A second laboratory course, Human Anatomy, is being offered online for the first time in Fall 2012, using the same course design as the Histology course. However, the need for three-dimensional slides for the laboratory portion offered new challenges for the

preparation of the slide box. Stefanie Attardi, a PhD student, looked at 11 commercial software packages to find the one that fitted their needs, Netter's Interactive 3D Anatomy Series. Each student gets a weekly file, with rotatable, interactive 3D specimens that can be virtually dissected.

The Netter's interactive images of the brain did not have the specificity needed for the Human Anatomy course so using the face-to-face lab specimens, and the skills and capacities of the [Instructional Technology Resource Centre](#) (also included in the Pockets of Innovation Series), a series of photos to provide 360 degree views were taken. About 72 shots of each of 20 brain specimens were taken to create the 3D models which were provided to students online and are available as open education resources. The students can interact with these specimens as they would with the ones in the lab, with the additional capacity for magnification. The [complete set of images](#) is available online.



Outcomes and Benefits

Access to the online lectures allows students to structure their learning time and approach to best suits their needs. Over the length of the course, many students move from attending the online synchronous classes to watching the asynchronous presentations, using the start, stop, and rewind capacities to their benefit.

Lectures can be downloaded to student computers, addressing the need for bandwidth for live viewing and making them accessible in rural areas. Students who are ill or are away from campus, such as athletes, are also given access to the online lectures.

With the online slides, students have unlimited access to their own slide sets to manipulate, study, and review at their pace. This individual access to the slide sets provides online students with more experience with the specimens than face-to-face students get in the lab period.

Both Michele Barbeau and Stefanie Attardi have found that “the transactional distance is less with online students than face-to-face” as many students are more inclined to

participate online. The use of polls, discussion questions, and the capacity to chat online make it easier to connect with students. The option of online participation in the live class also makes student feel they are truly part of the class.

Among the advantages of presenting the live lectures as the online content is the constant revision and updating of the lectures so that the information is always timely.

Student learning results and responses are being closely researched for publication.

Challenges and Enhancements

Convincing some of faculty of the advantages offered by online learning remains a challenge, although much progress has been made, particularly with senior management. The development of software that allows instructors to provide high quality teaching and learning has enhanced their acceptance of the potential.

On the other hand, some faculty continue to use models of online teaching that do not take advantage of the interactive and effective possibilities now available – and so the challenge is to bring their skills up-to-date.

Kem Rogers had found that even the ‘technophobes’ they may bring in as guest online instructors overcome their hesitations after their first experience, with the support of experienced teaching assistants and technology support staff.

Potential

Michele Barbeau would like to find more ways to integrate synchronous group work in the online courses to develop more of a community experience.

Kem Rogers sees the potential of getting an online, modular degree from Western, not to save space or reduce the need for instructors, but to expand access to a high-quality degree program. As well, additional higher level courses could be provided online, and courses in which class and laboratory attendance are essential, could adapt technologies to enhance the learning experience.

An eLearning Task Force, in which Dr. Rogers is participating, is currently developing a proposal for a strategic plan for elearning at Western.

For Further Information

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Barbeau, Michele et al. The Development and assessment of an online microscopic anatomy laboratory course. [Anatomical Sciences Education](#). Forthcoming.