

Editorial**CAN ANATOMY BE TAUGHT COMPLETELY ONLINE?****Geoffrey T. Meyer***School of Anatomy, Physiology and Human Biology, The University of Western Australia,
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Being primarily a teacher of “Histology” albeit also a passionate anatomy instructor at times, I probably cannot answer this question with authority but I know that when I was posed a similar question about teaching histology my answer was a firm “no!”. However, emerging technologies have changed that view - but also the move to offer student flexibility in their learning practices.

Histology is an image-intensive discipline. Most learning is completed examining histological sections of body cells, tissues and organs using a microscope. Providing these courses (particularly laboratory classes) for increasing numbers of student enrolments has become a very expensive commitment for a university department's budget. Learning in science courses (worldwide) is hindered by a number of issues particularly some associated with the delivery of practical classes and the resources required to engage students. A recent survey in our own school verified that traditional histology laboratory

practical classes can be deemed essentially a passive learning activity with the probable result of the students' lack of achieving many of the required learning outcomes.

A histology learning platform (<http://histology-online.com>) is now operative that has addressed these issues and more cost-effective solutions have now been achieved that have also improved student learning experiences and outcomes – particularly during laboratory practical exercises. Embedded innovative learning tools engaged students and achieved appropriate generic skills and higher level thinking skills.

The histology resources were initially created for a “blended learning scenario” as an online “tutor” for eliminating components of expensive laboratory practical classes. But, with many emerging new technologies more innovative, interactive learning tools were created and so there has been a dramatic paradigm shift in the way histology is now taught in our School of Anatomy, Physiology and Human Biology – i.e. completely online!

For the first time, an online histology course offered by the University of Western Australia is now offered by The University of California Los Angeles (UCLA) Extension (<https://www.uclaextension.edu>). A UCLA Extension online course in “Histology for the Health Sciences: Cells and Basic Tissues” has just been completed and attracted students across USA. An additional histology course “Histology for the Health Sciences: Cells and Basic Tissues” (to be presented completely online) is scheduled for the 2015 spring term.

As one of the USA's oldest, largest, and most comprehensive continuing higher education providers, UCLA Extension gives students all the options for course delivery and a wide range of courses are available. But importantly, sound, up-

to-date principles of online learning and teaching pedagogies are embedded in any delivery of the online course via a "CANVAS Instructure" LMS and a highly motivated and passionate staff at UCLA UNEX with skills in instructional designs and online learning and teaching pedagogies. In the case of the histology courses, innovative, interactive functionalities are embedded in the online histology platform engaging the students to interact with the content. Assignment activities again require students to engage in content and when they post their contributions on an open forum they discuss resources and help each other learn (peer assisted learning). Students complete review quizzes and use entries on the open forum to discuss possible answers and/or solutions to problems (peer assisted learning). The Open forum is a discussion site not a site focused on announcements/messages and so it is a forum to enhance the interactions amongst the student cohort. Constant input and direction in these open forums by the instructor provides the student the instructor's "visibility" in their learning activities. Innovative uses of "virtual microscopy" replace the difficult tasks students often confront, and express concerns, when using microscopes.

Perhaps this heralds a new era in not only histology learning and teaching but also in university education practices and provokes

some paradigm shifts in the business model of institutions of Higher Education? Why now invest enormous budgets in setting up expensive histology laboratory classes if they can be achieved at much less cost with thousands of students (worldwide) taking the same quality and accredited histology course online and engaging with a consortium of acclaimed teachers as academic instructors and student peer groups that become "student partners" in the learning process.

So I return to the title "Can anatomy be taught completely online?". My doubts about learning and teaching histology completely online have been dispelled as there is most compelling quantitative evidence that the transition to learning and teaching online has vastly improved students' learning experiences and their learning outcomes. But, as mentioned at the start, this has only been a result of emerging technologies and the move to offer student flexibility in their learning practices. "Can anatomy be taught completely online?". The hesitation I have in saying "no" means that one day the answer will be "yes" – at least to some significant extent as undoubtedly innovative technologies will continue to emerge. But, I strongly believe there will always be the need for any anatomy student to be mentored by their cadaver.