

Michelle McLean
Flipping Histology



Histology (Microanatomy) is traditionally difficult for medical students to master. It involves an understanding of how tissues are prepared, stained and sectioned. Each student needs to work out how best to identify the various tissues and often individual cells in glass slides.

This requires time in the laboratory as well as being able to visualise structures in 3D. During her first year at Bond, Professor Michelle McLean delivered an “inherited” set of laboratory notes and some modified PowerPoints in a traditional didactic way.

She was frustrated by student comments like “she uses big words”. As part of the implementation of a new curriculum in 2013, combined with an overarching philosophy of learner-centredness in which students are expected to be active participants in their learning, Michelle decided to “flip” the way students engaged with the Histology component in the integrated medical program.

Flipping Histology entailed using Camtasia to record a video version of what would have been a traditional didactic lecture delivered in a face-to-face class.

These voice-over PowerPoint (VOPP) videos are released at the start of the week with the appropriate problem-based learning case. Learners are expected to work through the VOPP in preparation for a quiz developed in TurningPoint (typically in groups), allowing students and Michelle to identify areas requiring further explanation.

This is followed a day or two later by a laboratory practical in which students consolidate their theoretical knowledge about tissue structure and function. Sometimes the week ends with groups of students working through clinical cases to apply their understanding of normal structure and function to when “things go wrong”. During these sessions, a clinician contributes so that students appreciate the relevance to clinical practice.

Successes and Benefits

Michelle believes that the majority of the students have embraced the challenge of preparing in advance for sessions. According to their online feedback and eTEVALS, VOPPs (+/- 1h duration) allow students to stop and re-listen as well as take notes.

Face-to-face sessions then become opportunities to check their knowledge and understanding rather than learn new content. Students have commented:

“The online podcasts are more educational than the in-class lectures for Histology because the online podcasts go into more depth and can be stopped and started to ensure we can go at our own speed.”

“The use of podcasts before lectures was really helpful, especially because you can do them in your own time and pause and take notes. The in-lecture quizzes also assisted in realising which concepts were more emphasised and delving into more complex questions was helpful as well.”

An analysis of the multiple choice questions over the past two years, revealed that students have passed most of the Histology questions well.

These questions typically feature images and application of knowledge, requiring higher order thinking skills. The point biserial (PB) indices are generally above 0.2, which is considered acceptable in terms of being discriminating.

A fair few PBs are in the 0.3-0.45 range, which Michelle takes as a success.

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Challenges

Flipping one's sessions takes time. In the particular case of Histology, any "lectures" (called large group resource sessions in Medicine) had to be recorded and this meant learning to use Camtasia software. Although Michelle doesn't consider herself to be a digital native or even digitally adept, she was able to successfully produce basic Camtasia videos. Michelle noted, however, the need for a refresher when she had not used Camtasia for a while. Once the VOPPs have been recorded, they can be effectively used until the slide content needs to be replaced or updated. With the assistance of the Office of Learning and Teaching it is, however, possible to edit the existing Camtasia videos, splicing and inserting updated content.

Feedback Received

Michelle's approach has hit the mark for students who have embraced the responsibility of preparing in advance for class. Students have commented that:

"(Michelle) uses many visual cues and asks complex questions."

"Her visual approach during the lectures and the fact that we would have to watch the lecture prior to the session and then do a quiz."

Only one negative comment was received from a student about the voice being too slow in the VOPPs. This student was presumably unaware that the VOPP (and hence the voice) could be sped up, suggesting that some students may need upskilling in technology use.

Impact on Student Learning

From the eTEVALS, it was clear that students recognised the importance of taking responsibility for their learning. Students identified where, when and how they had learnt:

"The way the laboratory sessions were set up meant that in order to get the most out of each session, we were encouraged to come prepared (and with prior reading/knowledge) otherwise we would not have gained as much from it."

"Asking questions during class and providing quizzes to test our knowledge forced me to be up to date with the current learning."

"The quiz was probably the most beneficial part for me as I was then able to really hone in on what I had understood and learnt, and what I hadn't."

"I liked that she would give us video podcasts for self-directed learning and would test our understanding during the large group sessions. I felt that I gained the most from her sessions for this reason."

"The quiz was probably the most beneficial part for me as I was then able to really hone in on what I had understood and learnt, and what I hadn't."

Advice to Colleagues

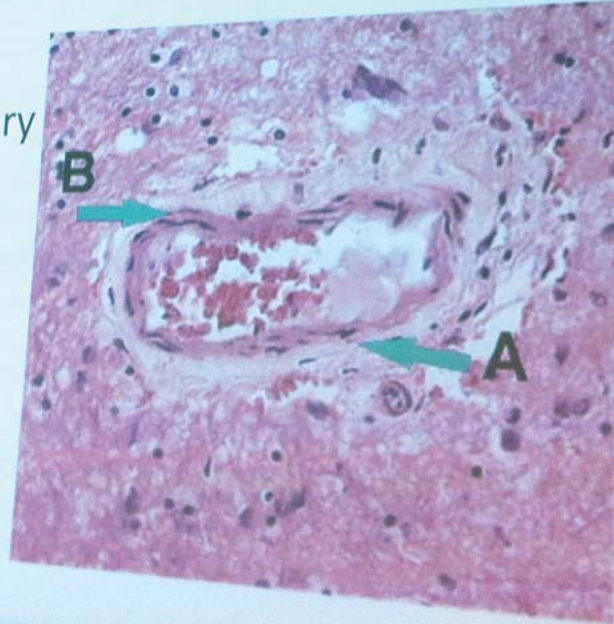
Take the plunge and switch from teaching to learning. Over the past two years, students have progressed from seeing Histology as a mountain to climb to something challenging but manageable. Some have even said that they "love" Histology! The effect of the flipping on Michelle's classroom in eTEVAL results was immediate, with both the qualitative and the quantitative components validating the approach.

Traditionalists might complain that if material is provided upfront (such as the VOPP), students won't attend sessions. Michelle has not found this to be the case. Attendance at the face-to-face sessions (quiz and practicals) is about 95%.



Q5. How would you classify this blood vessel?

1. Arteriole
2. Sinusoidal capillary
3. Muscular artery
4. Muscular vein
5. Large venule



Final Thoughts

Flipping Histology has not only relieved the stress of teaching a new discourse to first year students but has also alleviated their difficulties with getting to grips with the new terminology. Michelle is now working with colleagues to integrate the basic and clinical sciences. By the time this goes to press, a clinically qualified colleague and Michelle will have conducted a flipped session integrating the supporting connective tissue (cartilage and bone) (Histology) with osteology and arthrology (Anatomy).

Students will have been asked to view the relevant VOPPs ahead of time to familiarise themselves with the new terminology and the required Anatomy and Histology. In a large group, using full skeletons as prompts, students will have been quizzed about joints, bones, movement and tissues in the different body regions. By using two clinical cases, one involving an X-ray and the other a CT scan, students could then apply their theoretical knowledge in a laboratory practical session. ■

Michelle served as the Associate Dean, External Engagement & Marketing | Academic Lead for Problem-based learning at Bond University from January 2013-December 2015.

She has a degree in Biological Sciences, a Masters and PhD in plant and seed toxicology and mycology and a Masters in Education.

Michelle's interest in medical education began in the late 1990s when she became part of the Curriculum Development Task Force responsible for implementing a problem-based learning curriculum (University of Natal, which later became the University of KwaZulu-Natal). Michelle also worked for almost 6 years in Medical Education at the United Arab Emirates University.

Michelle's research has largely focussed on student experiences in different parts of their training.