Enabling Online, Real-Time Classroom Interactions with Digital Images to Support Student Learning

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Biomedical images are integral to the teaching of undergraduate gross anatomy, histology pathology, histopathology, radiology and microbiology. Through the BEST Network, UNSW Medicine pioneered the creation of a multi-institution biomedical image bank, Slice, (www.best.edu.au/slice), bringing together image collections from around the world. Slice is utilised in interactive learning sessions in both Science and Medicine courses at UNSW. The image annotation tool enables students and teachers to create and share knowledge regarding biomedical images. Building on this capacity for interactive image-based teaching, a collaborative annotation tool was developed to enhance both student-student and student-teacher interactions. The aim was to enable students to learn from one another as well as from instructors, as well as providing academics with the capacity to gauge their students' conceptions. The functionality enables learning exercises where:

1. Academics need to visualise students' work in order to provide feedback;
2. Students annotate features anonymously or in their own name;
3. Academics can control whether students can see each other's annotations;
4. Students can create their own annotation groups.

The annotation tool was designed to be flexible and scalable, and can thus support a blended learning approach for large Science and Medicine cohorts, notably including out-of-class collaboration and revision activities. Here we highlight recommendations based on the successful deployment of the tool in learning activities and provide feedback on the student experience.

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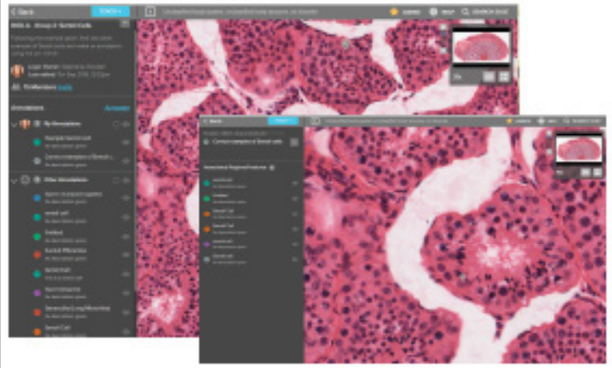
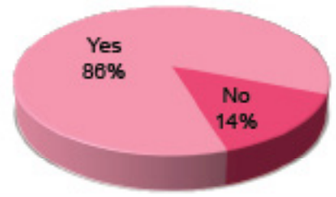
UNSW Medicine and Science courses utilise the online Slice biomedical image bank in undergraduate classes. It has long been possible for students to annotate images and use this for revision. Via a UNSW T&L grant, the annotation tool has now been enhanced, to enable students and teachers to interact online in real-time. Two successful activity styles are reviewed:

Student-teacher interactions



- Students find examples independently after guidance
- All student annotations are revealed
- Feedback given on correct annotations

"I felt that, through collaboration with my colleagues, I was able to learn more effectively than working alone" (n=97):



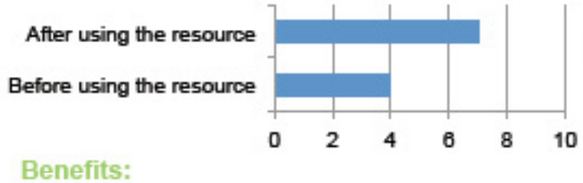
Benefits:
- Students liked the interactivity and comparing their answers to their peers

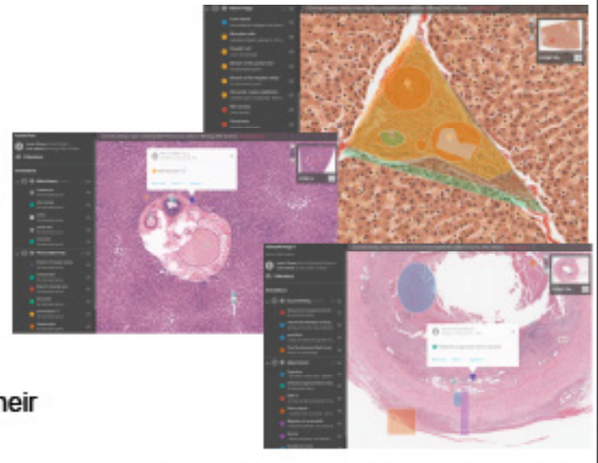
Recommendation:
- It was time consuming, but important to give individual feedback

Student-student interactions

- Students invite peers to layers
- Work in groups to annotate images under the direction of teachers

Please rate your understanding (n=228):





Benefits:
- Students felt that the activity helped improve their understanding and liked working together

Recommendation:
- While peer feedback was valuable, some students want feedback from their teacher as well

"Didn't have to ask tutors but could get friends to point things out to me"

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