

## **WebCT supported preparation for cytology practical classes in veterinary science**

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### **Introduction**

We have implemented on-line learning activities for cytology based on the understanding that flexible and adaptable learning situations which engage students to participate in and contribute to a learning community are the primary goal of education (Collis and Moonen 2001; Palloff and Pratt 1999). A flexible and interactive approach to learning in cytology aims to address specifically students' preparation for practical classes and their development of graduate attributes. Furthermore, the development of a learning community in the first three weeks of the degree assists in the first year transition from secondary to tertiary education.

### **Learning context**

Undergraduate veterinary science students enroll in a five-year professional degree. Veterinary undergraduates are generally high achievers, motivated, with an increasing number of international (~30%) and an increasing proportion of female students (~80%). The majority of students are recent school leavers with about 5% mature age students in the class of approximately 125. Veterinarians carry out a variety of activities on behalf of pet animals and their owners as well as playing a major role in the farm animal and food industry. The required skill set includes the application of scientific knowledge and skills in the field of veterinary medicine, but also the ability to communicate with clients and the public, manage a small business and work in a team. The Faculty has therefore developed graduate attributes (Faculty of Veterinary Science 2005) in alignment with the University of Sydney graduate attributes covering five key areas: research and inquiry; information literacy; personal and intellectual autonomy; ethical, social and professional understanding; and communication.

Cytology is taught in parallel with biochemistry in a 4 credit point unit in the first semester and provides a bridge between the study of chemical reactions in chemistry and biochemistry and the structure and function of whole tissues and organs. The learning activities include lectures, microscopy practical classes and tutorials and are supported by a *WebCT* site. *WebCT* is intensively used throughout the degree and this first year unit of study aims to introduce students to its use. Feedback from students and teaching staff as well as personal observation highlighted three areas of student needs, which were considered in the design of four new on-line activities: lack of preparation for practical classes, limited use of *WebCT* and the need to support students in the transition towards university.

### **On-line learning activities**

To address student needs a blended learning approach has been adopted: Face to face learning activities were enriched and integrated by four compulsory on-line interactive modules, which focus on the preparation for practical classes. These include interactive individual activities (Task 1), structured group discussions and learning activities (Task 2 and 4), and formative (Task 1 - 3) and summative assessment tasks (Task 4). Time during lectures and tutorials is used to introduce students to *WebCT* and to discuss the aim and the outcomes of the activities.



### **On-line tasks**

The use of virtual tools/laboratories can help students to familiarize themselves with new technical equipment before a practical class and thus reduce the stress and improve the learning experience in the class (Dalgarno, Bishop, Bedgood and Adlong 2004; Blystone 2003). On-line task 1 has three main components: Students are asked to download and read a document, which describes the key aspects of the use of the microscope; students are asked to perform a formative on-line quiz to enable self-assessment; students are encouraged to use a virtual microscope designed by Ketcham (2004) to familiarize themselves with the fundamentals of operating an optical light microscope.

Structured group learning activities have been reported to assist in the transition phase (Bourner, Hughes and Bourner 2001) by developing a learning community. On-line task 2 and 4 represent such group learning activities, which are supported by a *WebCT* discussion board and require groups to submit a final assessment task. Groups for both tasks are formed during the first tutorial. In task 2 each group member introduces themselves to the group using the discussion tool followed by submission of a short statement on one aspect of tissue preparation. One group member collates the work and submits it to the assessment drop box. The same groups are asked to work on the summative assessment task 4: each group is provided with a microscopic slide of a 'diseased tissue'. The groups have three weeks to describe the image, research the disease and submit a short essay. Students' learning is often driven by assessment and students' learning style is influenced by workload (Ramsden 1992). Therefore, the final task is replacing a previous written assignment. This reduces the workload for students and balances the workload for the instructor (less marking but more time spent on e-moderation).

The third on line task is a formative quiz with the aim to test students on four levels of increasing difficulty, using Bloom's Taxonomy of Educational Objectives (Bloom 1956) in the development of the levels. The task is not assessed and encouraging feedback is provided.

### **Activity map and website design**

The underlying activity map (Figure 1) and the website design were developed as part of EDPR 6012: Developing Flexible Learning Environments. For the activity map the 'Engagement Theory' defined by Kearsley and Shneiderman (1998) as an approach where students are 'meaningfully engaged in learning activities through interaction with others and worthwhile tasks', appears to be the most appropriate model. When designing the *WebCT* site an approach similar to the five-step model for E-moderating (Salmon 2000) has been implemented:

On-line task 1 tests if students can access the site and motivates students (Stage 1) to engage with the on-line activity using a non-assessed fun activity - the virtual microscope. Support for those with access problems can be offered during the three lectures scheduled before the first practical class starts. As students are asked to attempt the on-line quiz, the instructor can identify those that have not participated and follow up on potential reasons for the lack of participation – e.g., students were not interested to prepare or were not able to access the technology. On-line task 2 is a group activity, which includes aspects of on-line socialization (Step 2) by including a short 'e-tivity' (Salmon 2001), in which students introduce themselves to other group members using the *WebCT* discussion tool. Within the group students with different technical skill levels can support each other. This e-tivity is then followed by using *WebCT* (discussion tool in task 2 and 4, quiz in task 3) for information exchange (Step 3), which hopefully leads to knowledge construction (Step 4) (e.g., summary of tissue preparation and case study report in task 2 and 4, respectively). In addition, aspects of leadership and teamwork are implemented as students are asked to identify a group leader, who is responsible for submission of the essay and case study. The final step of development (Step 5) is achieved if students develop skills throughout this process that enable them to become responsible for their own learning and active members of the veterinary science learning community.

A large proportion of students might not achieve this high level of development. However, as a minimum effect students will gain a comprehensive introduction to a range of different tasks in *WebCT*, which is used widely in the curriculum. More importantly, students develop a learning community in the first three weeks of their studies and will be better prepared for their practical classes in cytology.

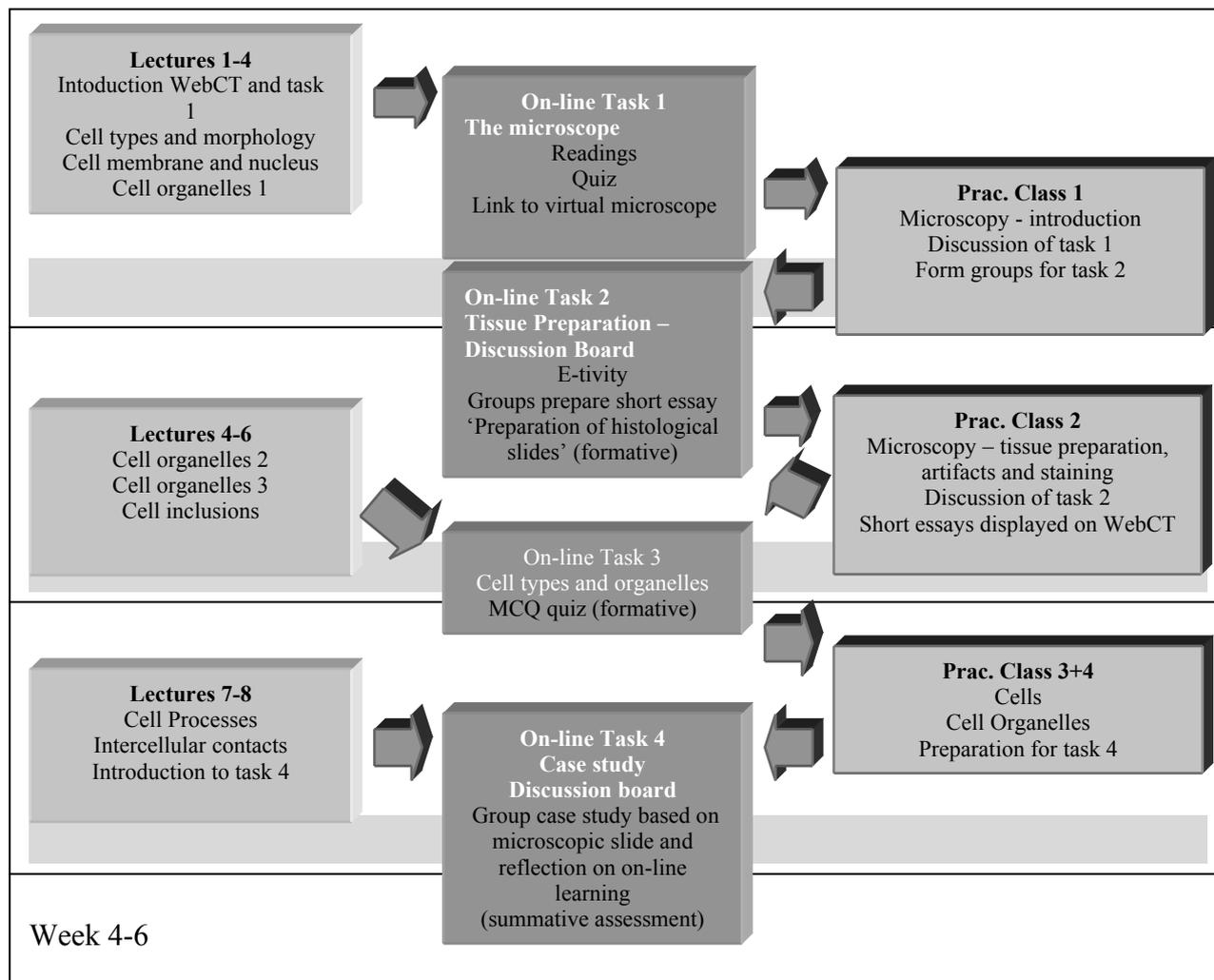


Figure 1. Activity map for the cytology component of Cell Biology 1A

## Evaluation

Evaluation of the quality of the learning experience and the functionality and user friendliness of the technology are key aspects in the implementation of on-line learning (Palloff and Pratt 1999). The on-line learning activities in this project were developed considering input from Gerard Marcus (Thyne Reid Teaching Innovations Unit) and feedback provided by colleagues and instructors in EDPR 6012: Developing Flexible Learning Environments; and were implemented in semester 1 2005. The blended approach has provided plenty of opportunity for direct student feedback (and immediate adjustment), which in parts was related to administrative problems caused by my inexperience with *WebCT*. Students (and myself) used the discussion board intensively sending a total of 1228 messages. A total of 99 messages were sent to all students in the general discussion forum and the remaining messages were sent within groups with an average of  $40.3 \pm 27.0$  messages per group. Eleven students (9,5%) replied via the discussion board to my request for written feedback on task 1 and 2. All students were in general positive (e.g., 'I thought the assignment was really valuable and I found *WebCT* really effective and efficient way of completing assignments as well!' or 'As an initial research and communication exercise, I think the assignment was valuable.



I'm sure it also sparked interest and involvement in the broader discussion boards.') and most made constructive suggestions for further improvement (e.g., group selections, clearer directions for referencing etc.). Similar verbal feedback was provided during the practical classes.

Additional quantitative and qualitative evaluation of student and staff perceptions of the educational benefits of these activities using focus groups are planned for next year and more general evaluation will be collected every three years via unit of study evaluation. Feedback and evaluation results will be continuously used to review the on-line tasks in their effectiveness of supporting students' needs.

## Conclusion

The introduction of these activities has increased the preparedness by students for tutorials (all students performed quizzes or activities before the classes), introduced students successfully to *WebCT* (all students used *WebCT* regular within the first three weeks of the degree) and students started building a learning community by successfully working in groups. The scholarly approach in developing on-line activities for cytology led to the implementation of a new learning activity that addresses key learning needs. Active use of the discussion forum and positive feedback from students indicate that the activities are well received, although minor refinements need to be implemented next year.

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