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1. Course: Computing Science 201 (CMPUT 201) – Practical Programming Methodology.

This is an introduction to the principles, methods, tools, and practices of the professional programmer. The lectures focus on the fundamental principles of software engineering based on abstract data types and their implementations. The laboratories offer an intensive apprenticeship to the aspiring software developer. Students use C and C++ and software development tools of the UNIX environment. See also http://www.cs.ualberta.ca/courses/cmput201.php

The lectures are scheduled for Tuesday and Thursdays, 12:30 PM to 1:50 PM. The course has lectures, a programming laboratory, three programming assignments, and both written and laboratory exams.

2. Goals for improving the course:

First, I would like to improve instructor-student interactions during the lectures. For example, using Virtual Network Computing (VNC) (http://en.wikipedia.org/wiki/VNC) (to be integrated by myself), students can a priori set up a problem they are having with their assignments, I can login into their running VNC server, and project their exact computer environment onto one of the projectors during the lecture. Currently, students can only verbally describe their situation. The dual projector screens, wireless networking, and VNC will improve class discussions involving the laboratory environment.

Also, I can pose a programming problem and use the student response system to have students indicate which is the correct solution from a list of possibilities. Many students resist answering with a "show of hands" because they lack confidence; the student response system might increase their anonymized participation.

Furthermore, I can continue with the normal lecture using one of the dual projectors and leave the question/problem on the other projector/screen. This would be a form of motivating the current lecture material with a specific and relevant problem. Currently, with single projectors, I must remove the problem statement from the screen in order to continue with the lecture. Second, I would like to improve the ability of the students to access their laboratory environment during the lectures, so they can try to solve problems as they are discussed in lecture.

3. Proposed teaching methods:

I propose to teach CMPUT 201 as a hybrid standard lecture and interactive laboratory. For example, 80% of each lecture will be a standard PowerPoint-based lecture, with occasional use of the student response system to consider specific programming

problems. The remaining 20% of each lecture will be open to students "showing" me their specific programming issue using VNC over the wireless network.

4. Information and communications technologies:

I expect to make extensive use of the dual projectors, the wireless networking, and the laptop power for the students. These technologies are key to allowing students to show me their programming problems and environment. Also, I hope to experiment with, and make use of, the student response system. My goal is to improve student participation in solving programming problems during lecture.

5. Proposed evaluation methodology:

I propose to perform a supplementary course evaluation with questions about the advantages/disadvantages of the teaching technologies and how they are used.
Also, I propose to use a combination of a blog/Wiki to document my experiences in the TELUS Centre and my use of the technologies. Other instructors accepted by the TTI will be welcome (encouraged!) to participate in the discussion and exchange of ideas.

6. Impact on teaching in the Department and Faculty:

Currently, the physical separation of lecture hall and laboratory in Computing Science is a barrier to fully integrating laboratory demonstrations into the lecture. Of course, many instructors already use their laptops to demonstrate laboratory concepts. However, it has been impossible for students to show the instructor (and fellow students) their laboratory computer environment. Now, with VNC and wireless networking, it is possible to better integrate the lecture and laboratory.

Within the Faculty of Science, the ability for students to access Web-based resources (e.g., WebCT, Wikipedia) during the lecture, and to show the instructor what they have found and/or their specific problem, might enhance the two-way exchange between instructor and student.