

## **Stakeholder Summary**

### **Online Learning Tools are Most Effective When Focused on Interaction**

First-year chemistry students at Carleton University have access to a wide range of online and electronic resources, including a website with lecture slides and useful links and videos, a video on demand (VOD) service to watch lectures remotely and a collaborative homework management system. A new study by the Higher Education Quality Council of Ontario (HEQCO) finds that these tools have a positive impact on students' grades, in particular the resources that focus on interaction with the course material and other students.

#### **Project Description**

*The Impact of Multiple Electronic Learning Resources on Student Academic Performance* examined 919 first-year students in the two half-credit introductory chemistry courses at Carleton University during the Fall 2011 and Winter 2012 terms. Every student enrolled in the courses elected to participate. The study is based on attendance, academic performance and online resource usage data. Attendance to lectures was not mandatory and therefore not tracked by the institution, so surveys were conducted seven times per term with students being asked to indicate which classes and tutorials they attended.

#### **Findings**

The electronic resources offered were used extensively by the students. The most significant impact on grades came from the homework management system, called WileyPlus, and an interactive learning management system called WebCT. WileyPlus allowed students to interact directly with course content by answering questions and solving problems while receiving immediate feedback on their progress. WebCT offered PowerPoint slides from lectures, videos of lab experiments, previous exams and a discussion board to communicate with other students. The authors feel the interactive nature of these two systems increased their impact and promoted greater student engagement with the content.

The VOD service allows students to watch lectures remotely at a time convenient for them. Typically the service costs \$50, but for students participating in this study the costs were waived. Use of this service had a negative impact on class attendance, although there was no impact on grades. The authors say that while the impact on attendance should always be monitored, with appropriate additional resources video lectures can be an acceptable way for students to learn.

Some of the other electronic resources, like WileyPlus and WebCT, had a positive impact on class attendance and the authors argue that the extensive analytics these tools offer could be used as a barometer for how connected students are in the classroom and offer valuable insights into overall student engagement.

*The Impact of Multiple Electronic Learning Resources on Student Academic Performance was prepared by Dr. Robert Burk, Patrick Lyons, Andrea Noriega and Dragana Polovina-Vukovic from Carleton University.*