

## Stakeholder Summary

### **Inverted classroom has positive impact on student learning experiences**

The inverted or flipped classroom can have a positive impact on student learning experiences including student-faculty interaction and in-class enjoyment, according to a new study from the **Higher Education Quality Council of Ontario (HEQCO)**.

The innovative teaching approach introduces students to course fundamentals through pre-class activities such as viewing a short video, devoting in-class time to learning methods that go beyond traditional lecturing. The study, *The Effects of the Inverted Classroom Approach: Student Behaviours, Perceptions and Learning Outcomes*, also found a positive impact on students' analytic problem-solving capabilities.

#### **Project description**

The study examined an engineering physics course of 300 students at the University of Toronto. The course was taught in winter 2012 using a traditional lecturing approach, while the winter 2013 course, taught by the same instructor, used the inverted classroom approach. Students were required to watch a 20 to 30-minute lesson video before each class, providing fundamental knowledge, definitions, equations, historical context and basic problem-solving examples. In-class time was used for more active learning opportunities including individual, partner or group exercises.

The researchers examined student behaviours and perceptions associated with the inverted classroom approach as well as its effect on student self-efficacy and learning outcomes. Data included prior academic performance and learning style, lecture attendance, student engagement and student-faculty interaction, students' evaluation of instruction, faculty course evaluations, pre- and post-instruction quizzes and final course grades.

#### **Findings**

Among research findings, there was significant improvement in quiz scores and student confidence in analytic problem-solving capabilities for the inverted classroom cohort, 70% of whom said they were satisfied with their level of interaction with faculty during class. More than half said that the inverted classroom approach made in-class time more enjoyable than a traditional classroom and their enthusiasm at the end of the course was significantly higher than that reported by the traditional cohort.

Over 70% of students in the inverted cohort said they were given the necessary support to learn the course material effectively and had the opportunity to have their questions answered. As well, more than 80% of the students in the inverted class found the lesson videos to be an effective introduction to the course materials.

However, only 48% of the students indicated that they preferred the inverted classroom approach to the traditional lecture format, with 36% preferring the traditional approach. The inverted classroom approach did not affect class attendance, which averaged about 60% for both cohorts. There were no statistically significant differences between the two cohorts in conceptual understanding of course material and only a slight improvement in final grades for the inverted classroom cohort.

### **Recommendations**

For successful implementation of the inverted classroom approach, the authors recommend that faculty motivate and support students to develop new learning techniques, carefully design the lesson videos or pre-class activities using a research-based approach, stress the importance of viewing the lesson videos before attending the class, properly integrate the pre-class lesson videos or activities with the in-class learning experiences, take the time to design well-structured and thoughtful in-class activities and provide a supportive learning environment through the use of appropriate technology and feedback mechanisms.

“As with any educational innovation, the use of the inverted classroom approach is not a solution in and of itself. It is a tool, a vehicle that can enable students to create long-lasting meaning for themselves through the supportive guidance of their instructor and peers,” the authors conclude. “It must be applied carefully, with consideration given to the holistic experience of the students and the fact that it is still an emerging teaching and learning technique for both students and instructors.”

*Authors of *The Effects of the Inverted Classroom Approach: Student Behaviours, Perceptions and Learning Outcomes* are Micah Stickel and Qin Liu, University of Toronto.*