HEQCO Learning Outcomes Assessment Consortium – Queen's University

Overview

Queen's University is committed to developing assessment techniques for higher-order cognitive transferable skills that map closely to the AAC&U Essential Learning Outcomes.[i] The four-year learning outcomes consortium project is a longitudinal study using embedded course assessments, standardized instruments and VALUE meta-rubrics[ii] to assess students' demonstration of transferable cognitive skills for critical thinking, problem solving, communication and the learning orientations and strategies involved in lifelong learning. Methods are aimed at sustainable assessment achieved within standard course contexts, and demonstrate the first steps to wider-scale rollout, including the development of internal processes for the implementation, management and assessment of university-wide learning outcomes. The project team is led by Jill Scott, Vice-Provost, Teaching and Learning; Brian Frank, Director (Program Development), Faculty of Engineering and Applied Science; and Natalie Simper, Research Project Coordinator.

Methodology and Timeline

The project contains two main phases:

Phase 1 | Development and Design (March 2013 – August 2013)

This phase of the project finalized the research design, including what instruments were to be used where and the identification of reliable tools that aligned with the learning outcomes selected. The four instruments being used to measure specific aspects of the learning outcomes fall under the following categories:

- Standardized measurements – Intended to measure development over multiple years; serve as an institutional comparison
    - Collegiate Learning Assessment Plus (CLA+) test[iii]
    - Critical Thinking Assessment (CAT) test[iv]
    - Motivated Strategies for Learning Questionnaire (MSLQ)[v]
- Course and program-based measurements – Designed to assess learning in a course or across the program
    - Meta-rubric assessment of course-based artifacts

In addition to these measures, student and instructor focus groups and interviews are collecting ongoing feedback on the developmental processes and utility of each of the instruments.

Phase 2 | Implementation and Analysis (September 2013 – August 2017)

This phase of the project was a three-pronged approach to the longitudinal assessment of transferable cognitive skills and learning orientations across a program:

A. Assessment using standardized quantitative instruments and meta-rubrics scored independently of course grading

B. Working with course instructors to align teaching, learning and the assessment of complex cognitive skills; embedding course-based "authentic problem tasks" for course grading and assessment

C. Data linkage to course grades and the National Survey of Student Engagement, and investigation of correlations between instruments, grades and survey scores for validity and reliability purposes

In the first year of the project nearly 2,000 first-year students participated in one or more of the assessment instruments. To form a baseline measure, fourth-year students were sampled from the same departments. The Faculty of Arts and Science (psychology, drama and physics) and the Faculty of Engineering and Applied Science (chemical engineering, civil engineering, computing engineering, engineering physics, geological engineering, math engineering, mining engineering and mechanical engineering) have consented to participate in the project. Students' learning orientations and cognitive skill development are being tracked through their core disciplinary programs in their second, third and fourth years.

As the research unfolded, a cyclical approach to the implementation was taken. The nature of assessment, evaluation, feedback and reflection became a tool for informing evidence-based decisions for course improvement. Working with course instructors to align teaching and assessment involved listening and providing targeted evidence-based feedback. Initial quantitative strengths and weaknesses in their students' demonstration of the learning outcomes and cognitive skills. This feedback provides the opportunity for evidence-based decision making to directly affect course improvement, renew course materials, and adapt or adopt new practices based on the student outcome feedback.

In addition to the assessment feedback, support mechanisms for instructors have been developed. The AAC&U VALUE rubric dimensions have been adapted to create a web application (BASICS) to facilitate

the generation of task-specific rubrics for course assessment. BASICS provides a workflow for constructing rubrics to evaluate student performance of cognitive skills, helping an instructor to quickly and easily define the cognitive skills they would like their students to demonstrate. It is open access, provides descriptions for levels of attainment for a particular task, and has edit and export functionality.

Successes and Challenges

As with any stimulus for change, building common understanding is not always a smooth endeavor. The researchers are working to determine how best to assess the longitudinal development of transferable cognitive skills in authentic, reliable and sustainable manner at the program and institutional levels. Despite institutional initiatives, change management remains a hurdle. We are working toward long-term sustainability of assessment processes, as fiscal and logistical consideration of assessment is an ongoing concern.

Highlights from our interim results suggest:

- Minimal improvement from first to second year on the CLA+, but significant improvement with the cross-sectional sample from first to fourth year
- Ongoing increases in critical thinking, problem solving and communication between first-, second- and fourth-year samples on the VALUE rubrics and CAT scores
- Participation rates among fourth-year students on the CLA+ are much lower than first-year rates, primarily because the first-year testing was conducted in scheduled courses; this was not possible for the fourth-year students. This problem has been identified in prior CLA studies and reflects the significant disadvantage of standardized tools compared to using VALUE rubrics and in-class artifacts.
- In courses where students were not specifically directed to demonstrate critical thinking and problem solving (i.e., not elicited in the assignment), the performance (as rated using the VALUE rubrics was lower than for their peers.
- Some course artifacts were not suitable for inclusion in the VALUE rubric marking because there was little or no alignment with the assessed dimensions. Courses that are highly technical in nature appear to have limited flexibility to adapt course assessments to specifically target critical thinking and problem solving
- The cost of implementing the VALUE rubric testing was approximately one-third that of the CLA_, and two thirds the cost of implementing the CAT

- The CLA+ and CAT results provide an opportunity to compare institutional performance with other schools. This is not possible with VALUE rubric scoring without common training and calibration procedures

Contact Information

For more specific information about this project or for any questions, please feel free to contact Fiona Deller, Executive Director, Policy and Partnerships at HEQCO, fdeller@heqco.ca, or Jill Scott, Vice-Provost, Teaching and Learning at Queen's University, scottj@queensu.ca.

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[i] https://www.aacu.org/leap/documents/EssentialOutcomes_Chart.pdf
[ii] The AAC&U VALUE Rubrics (Valid Assessment of Learning in Undergraduate Education) were created to advance learning outcomes assessment at the postsecondary level.
[iii] http://cae.org/participating-institutions/cla-institution-users-portal/cla-overview/
[iv] http://www.tntch.edu/cat
[v] http://www.queensu.ca/qloa/assessment-tools/transferable-learning-orientations-tlo-survey