Course Embedded Learning Outcome Assessment Based on Authentic Student Submission at the University of Guelph

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INTRODUCTION

Automating the aggregation and reporting of student learning outcome achievement data by course and by program is a very valuable data reporting function for institutional Administrators who are required to provide detailed course and program level evidence to funding and accreditation bodies. As a result, dozens of hours per class are spent by faculty compiling outcome achievement and grade results data at the end of a semester or academic year. Instead, this time can be invested in making informed decisions based upon performance data collected, analyzed, and aggregated in a click-of-a-button, cogent report.

The hours saved support a continuous quality-driven improvement cycle for courses and programs based on actual learning analytics performance data. Faculty can easily review and assess which assessment activities are effective and investigate others that might need attention as well as provide the opportunity to re-evaluate and make course adjustments in a relatively real-time manner throughout the term or in preparation for a following term or academic year. The availability of both standard reports and ad hoc database queries provide the dean's office and the office of institutional effectiveness with the program level reporting they need for making informed decisions.

METHODS

The University of Guelph implemented this course assessment strategy as a pilot for the Fall 2013 and Spring 2014 semesters. The plan is to roll-out to the entire Faculty of Engineering for the Fall 2014.

The primary goals of the original pilot were:

- To use data and information available to inform continuous improvement and accountability agendas in the enhancement of student achievement of program outcomes
- To incorporate D2L analytics to serve as a measure of student achievement of learning outcomes, in addition to those already in place
- To develop efficient, effective and appropriate practices for the incorporation of D2L analytics into program review processes

Reporting of outcome-based learning behaviors is driven from the course activity level by association with course embedded learning activities. The achievement or non-achievement of these learning activities by the learners can then be aggregated and reported up throughout the organizational structure. This provides outcome achievement reporting at the aggregated course level (multiple sections, semesters, instructors), at the program level, university level and at the Degree-level expectations. These learning activity achievement opportunities would be provided to the learners throughout their academic curriculum.

	Year 1	Year 2	Year 3	Year 4	Year 5
Planning & visioning	Assessment and review plan				
	Program visioning				
	Intended learning outcomes ¹				
	SWOT or SOAR analysis				
Surveys or Focus groups ²	Alumni, employer or industry			Alumni, employer or industry	
		In program students		In program students	
	Exiting students	Exiting students	Exiting students	Exiting students	Exiting students
Curriculum mapping		Curriculum mapping			
	Course progression maps ³				
Measures of student achievement over time		Self-assessment of learning		Self-assessment of learning	
			Concept and skill assessment (Pre)		

Figure1: Ideal Curriculum Timeline

The defined and stated learning outcomes for a specific degree attainment would be mapped down to courses in the curriculum. Those courses would also have pre-defined learning outcomes to which the individual learning activities would be associated. This Proof of Concept project at the University of Guelph is being implemented in conjunction with a larger Ontario based Productivity and Innovation Fund (PIF) project. This PIF project is a collaboration of five Ontario institutions; McMaster University, Mohawk College, University of Guelph, Wilfrid Laurier University, University of Waterloo. A brief synopsis of this project implementation and its goals will also be discussed during the presentation. Desire2Learn is providing the virtual learning environment platform and the reporting tools to support this endeavor.

DISCUSSION

To-date, approximately 10 engineering courses have been entered into the Desire2Learn Insights (analytics) module of the learning environment. Remaining courses core to the development and assessment of engineering graduate attributes will be integrated over the next two years. Early results suggest there are great opportunities to use analytics to better understand student achievement of learning outcomes across courses.

Automating the aggregation and reporting of learning outcome achievements is valuable. However, it is important to frame this initiative within larger curriculum development processes. Learning analytics can provide important measures on student development and achievement of program outcomes that, when *combined with other curricular assessment strategies*, can help to foster both continuous improvement of curriculum as well as solid evidence for program reviews and accreditation processes.

Individual assignments, rubrics or test items are identified by faculty as *key assessment indicators*. To-date there have been few challenges for faculty in associating assessment items to outcomes. However, while much useful data at the course level exists, identifying *valid and correlated key assessment indicators* at the program level will require statistical analysis of the preliminary pilot results, not yet completed. Faculty engagement will also be required to ensure that all attributes-related grading and assessment will be recorded within the Desire2Learn learning environment. Submission of grades using Desire2Learn is a policy already in-place, however only about 50% of University faculty are using that system. This should not be a major issue in our current pilot as Engineering faculty are extremely engaged and committed to this initiative

Workload and coordination issues are a focus. Front-end workload in setting up what is required by faculty and prior work needed to use analytics (mapping, attributes development, etc.) requires close coordination and development of longer-term process that engages faculty in curricular issues. Accessing curricular development support through our teaching centre has been key to ensuring that learning analytics is a meaningful component of educational development.

Technologically, the Desire2Learn learning environment shows tremendous promise in helping better understand and improve engineering education. A willing partner demonstrating that analytics is a key priority, Desire2Learn is working to evolve their solution through a balanced approach to accreditation and continuous improvement, increased adoption through improved user interface and developing specific customizations to reflect unique aspects of our university approach.

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