UPER Project – Final Report

Report Completion Date: (YYYY/MM/DD)

1. PROJECT OVERVIEW

1.1 General Information

Faculty/Department:	APSC / Chemical and Biological Engineering		
Degree Program:	BASc		
Project Title:	Evaluating student outcomes in Chemical and Biological Engineering to ensure impactful program redesign		
Principal Investigator/ Department Head:	Charles Haynes		
Other Applicants:	Peter Englezos, Louise Creagh, Jonathan Verrett, Dusko Posarac, Bhushan Gopaluni, Gabriel Potvin, Jim Sibley		
Report Submitted By:	Louise Creagh, Jonathan Verrett		
Project Initiation Date:	April 2019	**Project Completion Date:**	March 2022

2. GOALS, UNANTICIPATED OUTCOMES and NEXT STEPS

2.1 Goals – *With reference to the goals you originally identified in your project proposal, please list the goals of this project that were met, partially met, not met or removed. If not met or removed, please briefly mention the reason(s) for this. Please feel free to use a format other than the table provided.*

	Goal	Met	Partially met	Not met or removed	Reason (if "not met or removed")
1	Review evaluation systems	x			
2	Revise Graduate Attribute Indicators (GAI)	x			
3	Develop learning outcomes at each year level	x			
4	Develop Curriculum Map	x			

5	Develop and deploy Alumni Surveys	x			
6	Develop and deploy student Graduate Attribute Self-assessment	x			
7	Develop and deploy annual Assessment of Student Learning	x			
8	Engage alumni and industry		x		Challenges with in-person events due to Covid. Moved instead to engaging Alumni through online means including surveys and online events. In-person events will be scheduled in the up-coming year.

2.2 Unanticipated Outcomes – *If there were outcomes from the project that were not listed in the proposal, please list them here.*

- The new UBC Environmental Engineering (ENVL) program, first cohort to graduate in 2023, will be applying some elements of the project to their program including the Graduate Attribute Indicators, and the Curriculum Map.

2.3 Next Steps – *The goal of UPER was to support units in planning to reframe "undergraduate academic program design in terms of learning outcomes and competencies". Please indicate how you will implement the plans you developed along with any goals to share or extend the work done in your UPER project.*

- We will continue to refine the Graduate Attribute Indicators and investigate effective ways of visualizing data collected from course materials and surveys. These are necessary for our accreditation and contribute to that effort.
- We will update the Curriculum Map as required by changes in course offerings.
- We will hold in-person alumni and industry meetings to engage these important stakeholders in the continuous improvement of our programs.

2.4 Future Support – *How might the CTLT or other support units help you achieve your next steps? If you are unsure, please consult with the CTLT staff member who worked with you on this project.*

- CTLT has provided evaluation and planning support. In the future if we have questions on items related to this we will be reaching out to CTLT to engage relevant staff members to provide guidance or an outside opinion on our next steps.

3. IMPACT

3.1 Predicting and Confirming the Impact of the Project – *Considering the achievements to date and your expected next steps, please describe:*

- *Who will your UPER project impact? (e.g. students, instructors, TAs or community members) If possible, quantify the size and scope of the impact (e.g. number of students who will be impacted).*
- *How will they be impacted? (e.g. improved graduate outcomes, increased employability, etc.)*
- *What plans do you have for confirming, measuring or evaluating impact?*

Predicted Impacts		
Who (include size/scope)	**How**	**Plan for confirming, measuring or evaluating**
Students: Y2, Y3 and Y4 students in both CHML and CHBE programs. The combined total enrolment of both programs in 2021W was 478 students: 356 students in the CHML program; 122 students in the CHBE program.	Improved understanding of Engineers Canada Graduate Attribute requirements and therefore increased employability. Better understanding of the curriculum and links between courses. Improved learning outcomes.	Students take an annual self assessment of their competency in each Graduate Attribute. The first cohort to receive the Annual Assessment of Student Learning were Y2 students in 2021W; this cohort will also receive assessments when they enter Y3 and Y4. In this way the progress of each cohort in their understanding of core concepts can be monitored as they progress through the programs. After graduation, alumni will be engaged to provide feedback on their preparedness for their career.
Teaching Assistants: 43 TAs in the Department of Chemical & Biological Engineering participated in workshops to help create conceptual multiple-choice questions (MCQs) for the Annual Assessment of Student Learning.	In collaboration with CTLT, TAs received instruction in preparing and peer review of MCQs.	MCQs created by the TAs were reviewed multiple times and then ranked and finalized by course instructors.
Faculty: all department faculty (35).	Streamlined Graduate Attribute Indicators; better defined Learning Outcomes for each year level.	Feedback on the evaluation system will be discussed in faculty meetings and retreats.
Alumni: 20-30 alumni participate in the survey each year.	Surveys are sent annually to alumni 2 and 5-years post-graduation. The survey consists of a self assessment of their competency in each	Data from surveys are presented to faculty for discussion in faculty meetings and retreats.

	Graduate Attribute and their level of preparedness for their careers.	
Staff: student advisors in CHBE (4)	The Curriculum Map allows advising staff to better visualize the curriculum and understand connections between courses including pre-requisite and co-requisite requirements. A graphical user interface (GUI) facilitates entry of Graduate Attribute Indicator data and visualization of the results.	Feedback on the Curriculum Map and GUI will be discussed in staff meetings and retreats.

3.2 Dissemination – *Please provide a list of any past or upcoming activities (e.g. presentations, publications, etc.) through which you or anyone from your team have shared or expect to share information regarding this project.*

- 2022 TLEF and ALT-2040 Virtual Showcase, May 9 2022
- G Potvin, J Verrett (2020). Curriculum Renewal for Better Design-Related Student Outcomes in Second-year Chemical Engineering. Proceedings of the Canadian Engineering Education Association Annual Conference (CEEA 2020), Montreal, Canada. https://doi.org/10.24908/pceea.vi0.14126

4. REFLECTION:

What do you know now that you wish you knew before embarking upon your UPER project? What recommendations would you have for any future programs starting their own program renewal? The information you share will help us design better support resources and guidelines for future applicants.

- Focusing on limited but meaningful data collection. We have found it better to ensure data collected is highly relevant and focus our efforts on implementing sustainable data collection systems. There is always more data you can collect, but it is important to look at the impact of that data.
- Engaging all faculty early on in the project was very helpful. We did this through one-on-one interviews with most faculty about graduate attributes in our courses. Project updates were integrated into our annual department retreat, which kept faculty appraised of progress.