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Student Engagement as a Quality Measure in the Ontario Postsecondary Education System:
What We Have Learned About Measures of Student Engagement

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I.   Introduction

In recent years, there has been a great and growing interest in measuring educational quality in the Ontario postsecondary education sector (PSE). Colleges and universities are interested in quality measures for academic planning purposes. Reliable indicators would allow them to identify effective educational practices as well as areas for improvement and to develop strategies in the hopes of improving educational experiences for students.

The government is interested for accountability reasons. Quality has become an increasingly prominent focus of the McGuinty government, which seeks not only to increase the number of PSE graduates in the province but also to ensure the quality of degrees being awarded. Robust quality measures could be used to monitor individual institutional performance and to address issues at the sector level. Reliable and comparable provincial-level quality indicators could provide answers to questions such as how the Ontario PSE system is doing compared to other jurisdictions.

The problem, however, is that educational quality cannot be easily defined, measured or assessed. Traditional quality indicators consist of two types: input measures (e.g., student-faculty ratio, class size, operating revenue per student) and outcome measures (e.g., retention rate, graduation rate, employment rate). Many researchers have argued that the focus on input measures and the oversimplified use of output measures may create a misleading picture of the quality of PSE in Ontario. Using input measures as quality indicators ignores the substantial differences in the effectiveness with which institutions use available resources. Using output measures as quality indicators ignores the fact that universities differ from one another in terms of mission, size, location and student composition.

Higher Education Quality Council of Ontario's (HEQCO) *Second Annual Review and Research Plan* (HEQCO, 2009) argued that, "value-added" measures are the ideal measure of educational quality; that is, outcome measures after standardizing for the beginning characteristics of students, such as academic preparedness. However, value-added measures are expensive and hard to produce.

Given these limitations, the sector has turned to a fourth option: using learning process measures as quality indicators. One learning process measure that has received considerable attention in recent years is student engagement.

Student engagement is a broadly-defined term that describes the effort, interest and time that students invest in meaningful education experiences inside and outside the classroom (CCI, 2009). Surveys of student engagement are designed to measure student efforts and institutional practices that have shown to be correlated with positive learning outcomes such as increased persistence, better academic performance and increased graduation rates (Astin, 1993; Hayek & Kuh, 2004; Pace, 1982; Kuh, et al., 2005; Tinto, 1987). The implication is that the more colleges and universities engage students in educationally purposeful activities, the higher educational quality will be.

In recognition of the potential for student engagement to serve as a proxy measure of learning outcomes, Ontario universities offered to collaborate with the Ontario government to incorporate the periodic administration of engagement-related surveys and survey results as part of the quality indicators into the 2006-2007 to 2008-2009 Multi-Year Accountability Agreement (MYAA) frameworks. Ontario universities agreed to administer and report on the National Survey of Student Engagement (NSSE), while Ontario colleges were required to use the Ontario College Student Engagement Survey (OCSES). Recently, the KPI+ (Key Performance Indicators) pilot was introduced as a replacement to OCSES to measure student engagement in Ontario Colleges.

Given the integration of student engagement surveys into the Ontario PSE quality assurance framework, HEQCO sought to better understand the value of using these surveys for quality assessment and accountability purposes and to ensure that the Ontario-specific context is reflected in this understanding. The research work plan in this area was motivated by three key questions:

(1) Are the engagement survey tools currently used valid and reliable in the Ontario context[1]? Can the engagement measures predict learning outcomes of students?

(2) Can engagement surveys be used to guide and inform institutional management and planning by colleges and universities?

(3) Can engagement surveys be used for accountability purposes by the government or policy makers to monitor individual institutional performance and to address issues at the sector level?

This research note summarizes four evidence-based research projects supported by HEQCO to address these broad questions:

- *The NSSE National Data Project* (Conway et al., 2011)
- *Disappointment, Misunderstanding and Expectations: A Gap Analysis of NSSE, BCSSE and FSSE* (Mancuso et al., 2010)
- *Implementing Engagement Improvements Through Targeted Interventions: Intervention Processes, Impacts and Implications* (Conway, 2010)
- *Assessing the Validity of CCSSE in an Ontario College* (Mandarino et al., 2010)

Each project utilizes at least one engagement survey instrument within one or more Ontario/Canadian postsecondary institutions to gain knowledge of student engagement surveys.

This note is organized as follows. Section II presents an overview of the engagement-related survey instruments currently used in Ontario colleges and universities. Sections III-V present summaries of the four studies and what we have learned, structured to address the three key questions listed above. Section VI presents the implications of the findings of the four studies for colleges and universities and for the government.

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[1] Validity and reliability are arguably the most important properties of a survey tool. Validity is how well the survey is measuring what it says it is measuring. Reliability is the degree to which a set of items consistently measures the same thing across respondents and institutional settings. Factor analysis is the most commonly used empirical approach to measure validity and reliability.

II. Engagement Surveys in Ontario PSE system

NSSE in Ontario Universities

Since its inception in 2000, NSSE has become one of the most widely used postsecondary surveys currently in North America.[2] All Ontario universities administer NSSE on a regular basis, to first- and fourth-year students in first-entry undergraduate programs, as part of their accountability agreements (MYAAs) with the Provincial government. Summary statistics for all institutions are publicly available through Common University Data Ontario (CUDO: http://www.cou.on.ca/Statistics/CUDO.aspx) and a few publish more detailed results.

The Canadian English version of NSSE contains 105 questions/items. Over time, NSSE has developed various scales or indexes underlying the individual items in the survey instrument. The most prominent and frequently reported are the five NSSE benchmarks of effective educational practice assembled from 42 items. These are further decomposed into twelve subcategories or "scalelets" based on Pike's (2006) theoretical framework. In addition, two outcome items (*Gains in General Education* and *Gains in Practical Skills*) were also created in the same manner by Pike. NSSE's five benchmarks and twelve scalelets are:

Table 1: NSSE's Five Benchmarks and Twelve Scalelets

NSSE Benchmarks	NSSE Scalelets
Level of Academic Challenge (LAC)	o Course Challenge o Writing o Higher-Order Thinking Skills
Active and Collaborative Learning (ACL)	o Active Learning Experience o Collaborative Learning Experience
Student-Faculty Interaction (SFI)	o Course Interaction o Out-of-Class Interaction
Enriching Educational Experiences (EEE)	o Varied Experiences o Information Technology o Diversity
Supportive Campus Environment (SCE)	o Support for Student Success o Interpersonal Environment

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[2] Since 2000, NSSE has been administered at least once at over 1,400 universities in the United States and Canada. Detailed information on NSSE is available at http://nsse.iub.edu.

There are also a number of complementary instruments to NSSE including the Beginning College Survey of Student Engagement (BCSSE), the Faculty Survey of Student Engagement (FSSE) and the Classroom Survey of Student Engagement (CLASSE). BCSSE collects data on entering students' high school experiences and their expectations for participating in educationally purposeful activities during their first year of university (BCSSE, 2004). FSSE is designed to measure faculty expectations and perceptions of how often students engage in different activities. CLASSE is a course-specific version of NSSE, designed to gauge student engagement at the individual course level.

Community College Survey of Student Engagement (CCSSE) in Ontario Colleges

The Community College Survey of Student Engagement (CCSSE) has not been as widely administered in Canada as has NSSE. Only three Canadian colleges[3] have participated in CCSSE since it was launched in 2001.

CCSSE was established by the Community College Leadership Program at the University of Texas at Austin. CCSSE works in partnership with NSSE and was created to address the need for a student engagement survey specifically designed for community and technical colleges. Similar to NSSE, CCSSE also has five benchmarks of effective educational practice, although the categories vary slightly[4]:

- *Active and Collaborative Learning*
- *Student Effort*
- *Academic Challenge*
- *Student-Faculty Interaction*
- *Support for Learners* (CCSSE, 2008; McClenney, 2006)

These five benchmarks consist of 38 engagement items from the survey that reflect many of the most important aspects of the student experience (CCSSE, 2007).

Ontario College Student Engagement Survey (OCSES) and KPI+ in Ontario Colleges

Beginning in 2006, Ontario colleges used the Ontario College Student Engagement Survey (OCSES) to measure student engagement. OCSES was originally known as the *Pan-Canadian Survey of College Students*. It was developed based upon Tinto's "person-environment fit" model, which suggests that student success and retention are functions of the fit between the characteristics of the student and the learning environment of the institution he or she attends (Tinto, 1987).

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[3] Douglas College in British Columbia participated in 2003 and 2007; Nova Scotia Community College participated in 2008; Humber Institute of Technology and Advanced Learning in Ontario participated in 2009.
[4] Please refer to *Measures of Student Engagement in Postsecondary Education: Theoretical Basis and Applicability to Ontario's Colleges* (CCI, 2009) for a summary of the similarities and differences between CCSSE and NSSE.

The *OCSES Review Working Group* was created in 2007 to review various aspects of the OCSES such as its content, length, administration and the quality of analysis it provides. Based on research and recommendations from the Working Group, the Ministry of Training, Colleges and Universities (MTCU) and the KPI Steering Committee agreed to discontinue the use of the survey as of the 2009-2010 academic year. Instead, 24 engagement questions are currently being piloted with Ontario colleges using the existing KPI Student Satisfaction Survey[5] in 2009-2010 and 2010-2011. This new KPI survey is called the KPI+. The objective of the KPI+ Pilot is to assess the effectiveness of the KPI+ survey in contributing to the colleges' and MTCU's measurement of student engagement.

III. Are the engagement survey tools currently used valid and reliable in the Ontario context? Can the engagement measures predict learning outcomes of students?

The two major assumptions of using measures derived from student engagement surveys as educational quality indicators are: (1) the surveys provide valid and reliable measures of students' educational experiences; and (2) students' educational experiences are related to learning outcomes. Therefore, it is crucial to ensure that the survey tools currently used in Ontario PSE institutions are valid and reliable and that logical relationships exist between engagement measures and actual learning outcomes.

NSSE

The validity and reliability of NSSE, the five benchmarks and the 12 scalelets have been examined extensively in the US; however, there are concerns about their statistical validity and effectiveness in the Canadian context. As part of the HEQCO funded *NSSE National Data Project* (Conway et al., 2011), detailed interviews were conducted with representatives of a dozen Canadian universities to obtain their opinions on NSSE-related issues. In general, the NSSE instrument is widely considered to be a valid and reliable tool by the interviewees who represent academic administrators, faculty members, service providers and institutional researchers of the participating universities. However, several interviewees argued that more research needs to be done in Canada on the relationship between measured engagement and

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[5] Ontario College KPI Student Satisfaction Survey is a part of the "Key Performance Indicators" program mandated by the Ontario Ministry of Training, Colleges and Universities (MTCU) since 1998. The purpose of the KPI program is to measure the satisfaction of college students, graduates, and employers as well as each college's graduation rate and graduate employment rate. Other surveys under the KPI program include Graduate Satisfaction Survey and Employer Satisfaction Survey.

actual outcomes (e.g., value-added, student retention, grades) in order to increase support for NSSE and to help direct institutional actions.

The NSSE interventions study funded by HEQCO is the first multi-institution project in Canada to explore the relationship between measured engagement and actual outcomes (Conway, 2010). The project employed NSSE, CLASSE and other measurement tools to assess the effectiveness of engagement-related programs and services at several Ontario universities. The primary objective of the project is to assess whether NSSE/CLASSE items or benchmarks detect changes in student engagement before and after an intervention was implemented and whether positive changes in student engagement translate into positive learning outcomes.

Ten interventions administered in nine universities[6] were selected and assessed by a steering committee. NSSE was used as the assessment tool in all ten interventions; CLASSE was used in four interventions as an additional tool. A number of outcome measures, including grades and attrition status, were also incorporated into some of the interventions to assess whether engagement interventions improved student learning outcomes.
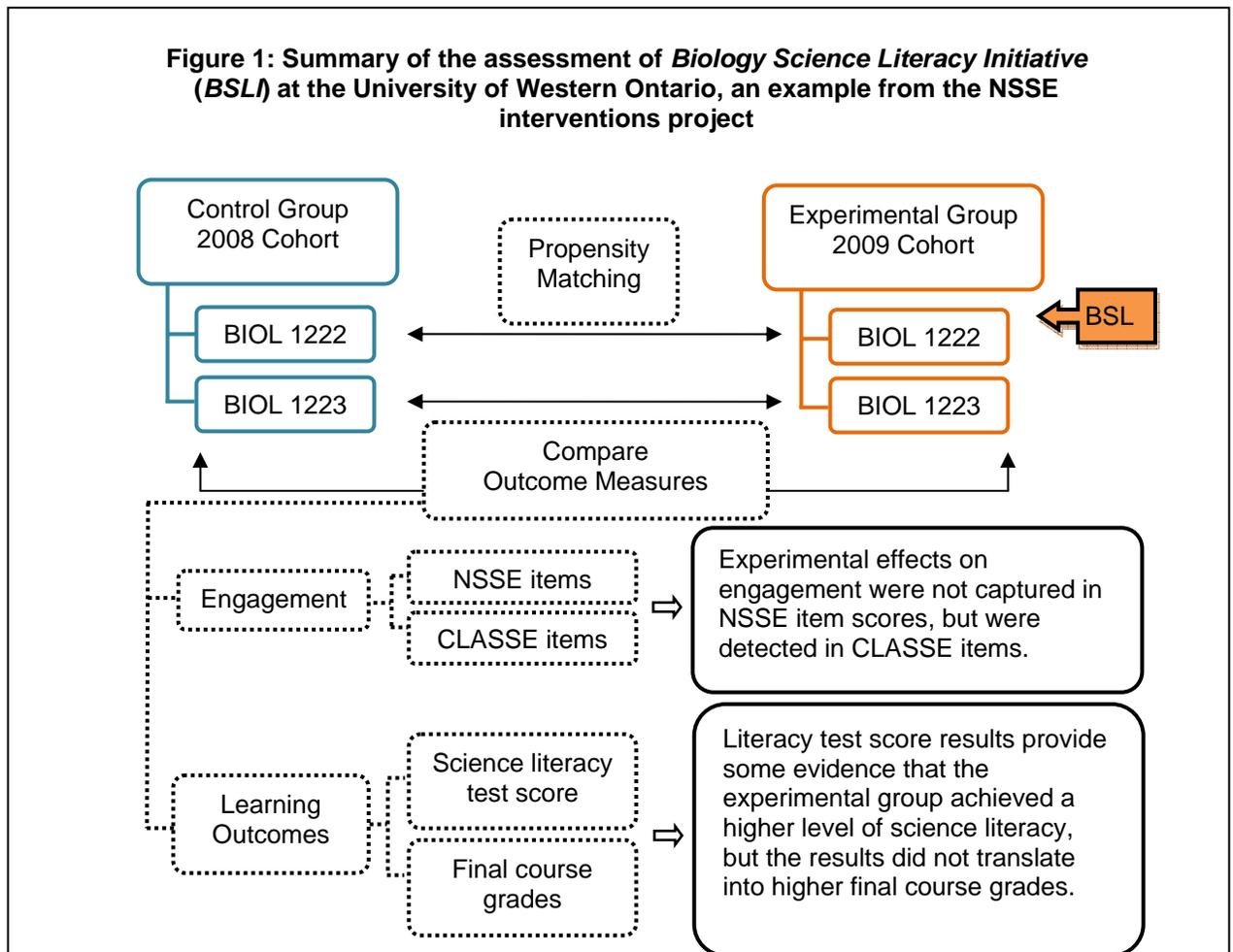
One example of the interventions this project documented and assessed was the *Biology Science Literacy Initiative* (*BSLI*) at the University of Western Ontario. The objective of *BSLI* is to fully integrate the development of science literacy skills into the first-year undergraduate biology curriculum. The *BSLI* was implemented in two large, full-year introductory Biology courses in the 2008-2009 academic year:

- *BIOL 1222*, for students who have completed a high school Biology course
- *BIOL 1223*, for students without high school Biology grades or sufficiently high grades

Figure 1 demonstrates the assessment process of this intervention. Students enrolled in *BIOL 1222* and *BIOL 1223* in 2008 were selected as the control group. The experimental group, in which *BSLI* was implemented, consisted of students enrolled in one of the two courses in 2009. To ensure sample similarity between the control group and the experimental group, propensity matching[7] was performed separately for the two courses. Three assessment tools, including NSSE, CLASSE and an online science literacy assessment, were used. Both engagement and learning outcome measures were compared between the control group and experimental group to assess how well the tools detected changes caused by the intervention and how effective the intervention was.

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[6] Please refer to Appendix A of this research note for a list of participating universities, description of the interventions, summary of measurement tools and dependent measures used in the NSSE interventions project.
[7] Propensity matching is a statistical tool used for identifying a suitable comparison group to compare to the experimental group. In this example, the matching was performed using basis of admission (direct/indirect from high school), registered faculty, gender, Grade 12 Biology grade and entering average. That is, the propensity matching finds a group of students in the control group who have the same characteristics (as listed) as students in the experimental group, so the estimation of intervention effect is not biased due to differences in student backgrounds.

Figure 1: Summary of the assessment of *Biology Science Literacy Initiative* (*BSLI*) at the University of Western Ontario, an example from the NSSE interventions project

Control Group 2008 Cohort	Propensity Matching	Experimental Group 2009 Cohort
BIOL 1222	←→	BIOL 1222 ← BSL
BIOL 1223	←→	BIOL 1223

Compare Outcome Measures

| Engagement | NSSE items | ⇒ Experimental effects on engagement were not captured in NSSE item scores, but were detected in CLASSE items. |
| | CLASSE items | |

| Learning Outcomes | Science literacy test score | ⇒ Literacy test score results provide some evidence that the experimental group achieved a higher level of science literacy, but the results did not translate into higher final course grades. |
| | Final course grades | |

The assessment reveals that the experimental effect of *BSLI* participation was not reliably captured in NSSE item scores, but was detected by CLASSE items. For learning outcome measures, the experimental group achieved a higher level of science literacy scores, although the results do not appear to have translated into final course grades.

The findings from the other nine interventions provide evidence of similar results: NSSE items and benchmarks were generally unable to detect the effects of the interventions, but the course-based version of the survey (CLASSE) and other measurement tools showed significant promise in a number of the interventions.

KPI+

The KPI+ working group is currently assessing the effectiveness of the colleges' KPI+ survey as well as the reliability and validity of the instrument. The effectiveness of the survey will be determined based on the following five evaluation objectives, as listed in the "KPI+ Student Engagement Pilot Evaluation Plan":

1. Assess the effectiveness of the survey administration process
2. Assess whether results of the survey produce information that a college can act upon for improvement
3. Assess the range of results across participating colleges to examine reliability of the survey
4. Assess the effectiveness of survey questions as measures of engagement
5. Assess the potential impact of engagement responses on the KPI Student Satisfaction Survey longitudinal data set

CCSSE

The Humber College's CCSSE study *Assessing the Validity of CCSSE in an Ontario College* (Mandarino et al., 2010) is one of the first efforts by an Ontario college to explore the validity of CCSSE in the Ontario/Canadian context. Humber participated in CCSSE during the winter 2009 semester. The stated objective of the project is to determine the degree of confidence with which CCSSE survey results can be used to inform quality-improving actions by the college.

The survey sample consists of 1,030 full-time students enrolled in Humber's one-year certificate or two- and three-year diploma programs during the winter 2009 semester. Results of the analysis support the view that CCSSE is a valid tool to measure student engagement as found in the US literature and provide evidence that CCSSE is a valid tool in the Ontario/Canadian context.

In addition to assessing the validity of CCSSE, the Humber CCSSE study also examined the relationship between CCSSE benchmarks and academic outcomes. That is, it provides an examination of whether a student's degree of engagement can predict his/her learning outcomes. The researchers used five learning outcome measures:
- Self-Reported GPA
- End of Semester GPA (winter 2009)
- Cumulative GPA
- Credit Completion Ratio
- Percent of Courses Completed with a Grade of 70% and Higher

The analysis indicates that two CCSSE benchmarks (*Active and Collaborative Learning* and *Level of Academic Challenge*) are significantly correlated with all five outcome measures. However, the correlation is not as strong and significant when student background information (age, gender, first language, international student status, high school GPA, race, first generation student status) is controlled for. In the formal statistical model, only *Academic and Collaborative Learning* and *Level of Academic Challenge* are indentified as predictors of the first four of the five outcomes. No benchmarks were identified as having a net effect on *Percentage of Courses Completed with a Grade of 70% and Higher*.

Figure 2: CCSSE benchmarks as predictors of *End of Semester GPA* (winter 2009), estimated coefficients from correlation analysis and regression analysis
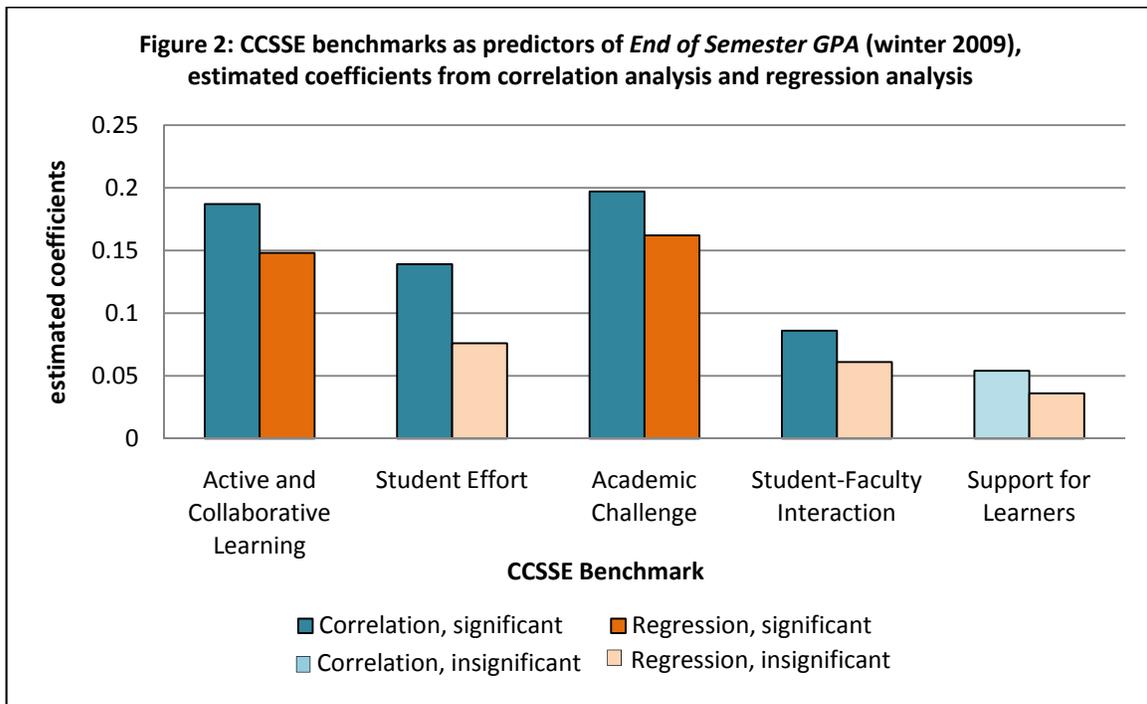
Figure 2 shows the analysis results for the relationship between each CCSSE benchmark and *End of Semester GPA*. The blue bars represent the estimated correlations; the orange bars represent estimated coefficients from the regression analysis. Statistically significant relationships are shown in solid colours, while insignificant relationships are in faded colours. As presented in Figure 2, four of the five CCSSE benchmarks are significantly correlated with *End of Semester GPA*; however, after controlling for student demographic information, only *Active and Collaborative Learning* and *Academic Challenge* are significant predictors of *End of Semester GPA*.

What we have learned:

- The NSSE instrument is generally considered to be a valid and reliable tool; however, there are some concerns about its statistical validity and effectiveness in the Canadian context.
- The findings of the NSSE interventions project indicate that the detection power of NSSE is not strong enough to capture changes imposed by small-scale interventions (e.g., single course-based changes and single service changes). CLASSE, the course-based version of the survey, has stronger detection power when assessing course-based interventions. This conclusion implies that engagement survey tools designed for institutional level analysis may not be best suited to assess small-scale interventions. Additional survey assessment tools may need to be incorporated into the process of assessing the effectiveness of small-scale interventions.
- The Humber CCSSE study concludes that CCSSE is a valid engagement tool to be administered in Ontario Colleges. The study has also shown that student

engagement (measured by CCSSE benchmarks) has positive relationships with outcome measures including academic performance and course completion rate. Findings indicate that student engagement is associated with positive learning outcomes, though some CCSSE benchmarks have weak predictive power for learning outcomes.

IV. Can the surveys be used to guide and inform institutional management and planning by colleges and universities?

Colleges

All Ontario colleges have participated in the OCSES and KPI Student Satisfaction Survey since they became mandatory in 2006-2007, as part of the MYAA framework. Most Ontario colleges indicate in their MYAA report-backs[8] that they have been using their own institution's OCSES and KPI data to develop strategies and programs to:
- support the increased participation of under-represented groups
- improve student/faculty engagement
- improve retention
- improve student satisfaction
- set priorities for investments in programs, services, facilities and equipment

However, few of those practices and experiences are recorded or shared publicly.

Universities

In contrast, Ontario universities have been using NSSE results extensively to guide institutional management and planning. HEQCO has funded research on two initiatives: the Guelph gap analysis study sets a good example of how institutions can use NSSE data for self-evaluation; and the NSSE interventions project demonstrates that NSSE data can be used to support improvement initiatives of institutions.

Evidence from the University of Guelph's gap analysis

The University of Guelph's gap analysis shows how institutions can use engagement survey results to identify areas where they are performing well and where aspects of the undergraduate experience could be improved. The researchers found that the BCSSE and FSSE results are effective complements to the NSSE results, particularly

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[8] Multi-Year Accountability Agreement Report-Back is a template designed by the Ministry of Training, Colleges and Universities to assist with the Ministry's continuing efforts to measure the accountability, accessibility and quality of Ontario PSE institutions. As part of the MYAA framework, each Ontario institution agreed to report a number of quality indicators as included on the MYAA Report-Back template to the ministry every year during the period in which MYAA is in effect.

because they identify the gaps between students' expectations and actual experiences and the gaps between student reports and faculty perceptions of student experiences.

The report used data from BCSSE, NSSE and FSSE at the University during September 2005 to March 2007. As mentioned previously, BCSSE collects information on entering students' experiences and expectations for engagement. This information was linked with the same cohort of students' NSSE responses at the end of their first year to create a "disappointment gap": a measure of how far students' actual experiences fell short of their original expectations. Similarly, FSSE results were linked with NSSE results to create a "misunderstanding gap": a measure of the gap between faculty perceptions of student engagement and students' perceptions of their own engagement levels. The gap analysis is based on Pike's (2006) theoretical framework of twelve scalelets and outcome measures (*Gains in General Education* and *Gains in Practical Skills*), as discussed in Section III.
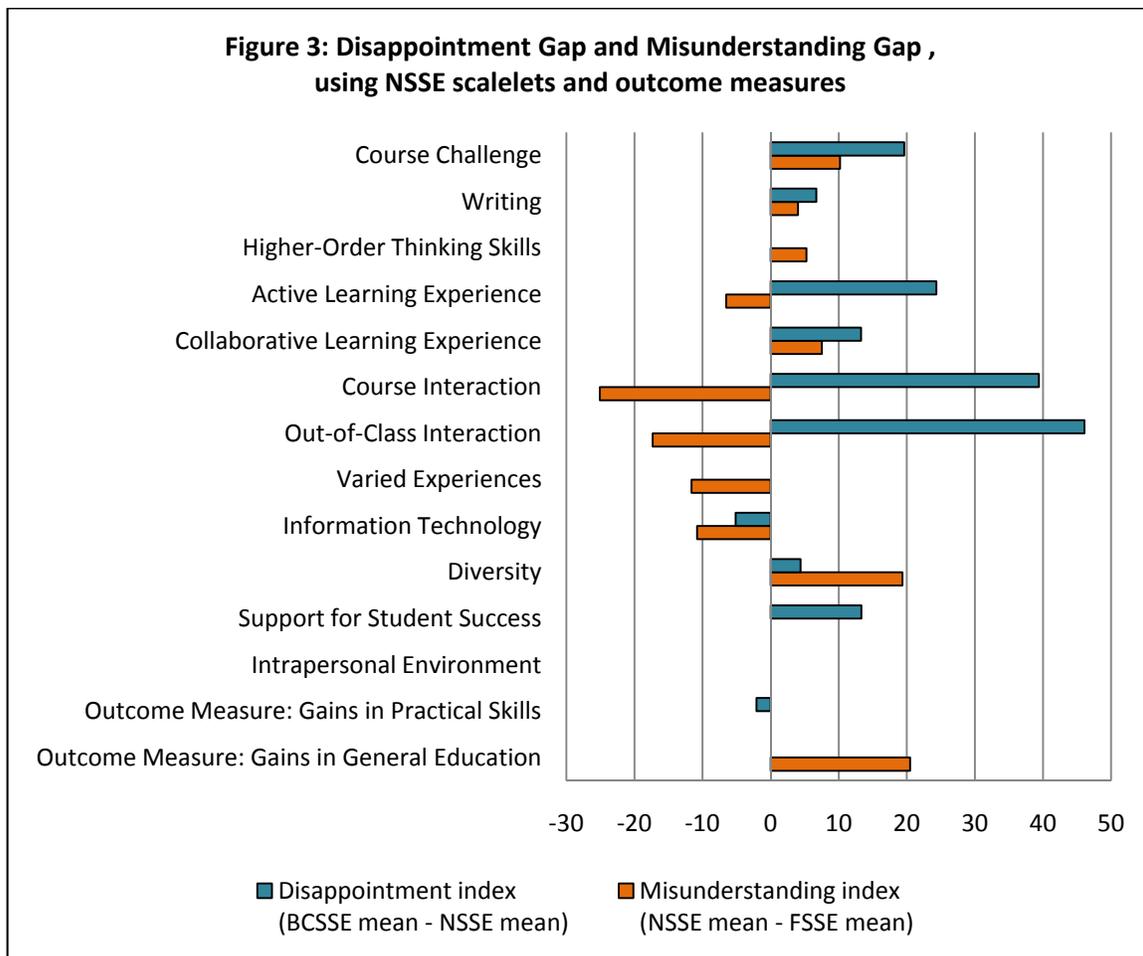

Figure 3: Disappointment Gap and Misunderstanding Gap , using NSSE scalelets and outcome measures

Figure 3 shows the estimated disappointment index and misunderstanding index using NSSE scalelets and outcome measures.[9] The disappointment index is calculated by subtracting the NSSE mean from the BCSSE mean – the higher the index, the more students' actual experiences fall short of their expectations. Similarly, the misunderstanding index is calculated by subtracting the FSSE mean from the NSSE mean – the higher the index, the wider the gap between student and faculty assessments of the student experience.

A consistent pattern is found with respect to the disappointment index. Students report (in NSSE) significantly lower levels of actual engagement than they had expected (in the BCSSE). For eight of the 12 scalelets analyzed, the disappointment indexes are positive and significant. One exception to this consistent pattern is the *Information Technology* scalelet, where the use of advanced technology in the institution is better than what students expected. However, regardless of how disappointed students might be with some aspects of their educational experience, their overall impression of the outcomes is slightly better than what they expected with respect to *Gains in Practical Skills.*

The misunderstanding gap swings two ways. When the engagement activities involve direct faculty interaction, faculty tend to be more positive than the students and report a higher student engagement level (negative values for misunderstanding indexes); when the activities do not involve direct interaction with a faulty member, faculty tend to underestimate the engagement performance of first-year students (positive values for misunderstanding indexes). With regard to outcome measures, students' overall perception of *Gains in General Education* is better than the faculty's perception.

In this study, one of the particularly promising aspects is that BCSSE and NSSE data are collected from the same cohort of students. This allows the institution to track students' expectations and experiences before and after their transition into first-year university life. The linking and comparison of BCSSE, NSSE and FSSE enable the tracking of students' changing perceptions over time and capture different perceptions between students and faculty members.

Evidence from the NSSE interventions project

As noted in the Introduction, the ultimate goal for collecting and analyzing engagement measures is to use the results to identify promising interventions or educational practices to improve student engagement and therefore improve educational quality. Based on a review of US engagement implementation practice, Chris Conway (2010) identified six implementation stages using NSSE as a tool to achieve this goal:
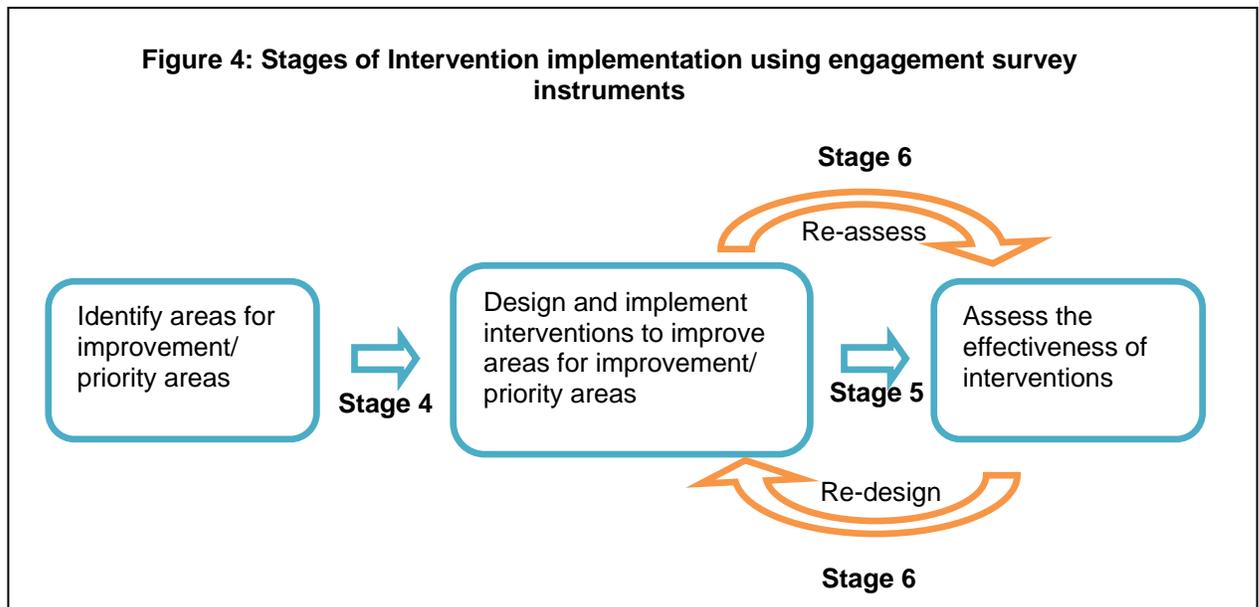1. Analysis of survey results
2. Dissemination of results to internal and external audiences
3. Integration of NSSE into institutional processes

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[9] The missing indexes in the graph are either non-significant values or missing values due to survey comparability issues between NSSE/FSSE and NSSE/BCSSE. Please refer to the "Survey Comparability" section of the original report for more information.

4. Informal implementation based on NSSE findings but without formal assessment
5. Formal implementation based on NSSE findings and including formal assessment
6. Continuous improvement through repeated implementation-assessment-retesting

Stages 4 through 6 are directly related to intervention implementation activities. Figure 4 demonstrates the process of intervention implementation and assessment (stages 4, 5, 6). Stage 6 depicts the ideal process: first, identify areas that need to be improved based on NSSE results (or other survey instruments), develop interventions to address the areas for improvement or institution-specific priority areas, assess the effectiveness of the interventions by comparing NSSE scores pre- and post-intervention and finally repeat the implementation-assessment-retesting to further improve the design of the interventions.

Very little documented implementation activity in the US and Canada could be found occurring at stages 5 or 6, however. There exists little detailed documentation of implementation practices and formal evaluation has rarely been done. In order to fill this gap and create opportunity for information sharing, the NSSE interventions project was created to share an inventory of implementation practices and to support engagement-related interventions at Ontario institutions. Moreover, the project aimed to help institutions conduct formal assessments of the interventions using appropriate tools and methodologies and the best available data.

Figure 4: Stages of Intervention implementation using engagement survey instruments

Stage 6

Re-assess

| Identify areas for improvement/ priority areas | Design and implement interventions to improve areas for improvement/ priority areas | Assess the effectiveness of interventions |

Stage 4   Stage 5

Re-design

Stage 6

All of the interventions[10] selected under this project occur at stages 5 or 6. Not only were all the interventions developed formally based on survey results, they were also being formally assessed using various survey tools including the NSSE, FSSE, BCSSE and CUSC surveys. For example, the Carleton University's TA Mentorship intervention model was developed based on Carleton students' higher-than-average dissatisfaction with teaching assistants, as reflected in NSSE responses. For the purpose of assessing the effectiveness of the intervention, Carleton identified 12 NSSE items, three NSSE benchmarks and one Canadian University Survey Consortium (CUSC) survey item that reflected the goals of the TA mentoring program to be included in the assessment[11]. However, the assessment results indicate that the intervention had no experimental effects. As described above, this result is likely due to the weak detection power of NSSE for intervention effects.

What we have learned:

- Most Ontario colleges indicate they have been using engagement survey results to guide institutional planning; however, few of those practices and experiences are recorded or shared at the sector level. More initiatives could be taken in the college sector to establish an inventory of how Ontario colleges are using engagement surveys for institutional management and planning.

- The University of Guelph's gap analysis project is an example of how to identify the disparities between students' expectations and actual experiences, and the gap between student reports and faculty perceptions of student experiences. This type of analysis can be used to identify institution-specific areas that could be improved, which in turn can aid in the design or improvements of engagement strategies in light of institution-specific missions and goals. FSSE results may also help encourage faculty members to reflect on their teaching and interactions with students.

- Ideally, the process for engagement intervention implementation and assessment using survey tools should follow these steps: identify areas that need to be improved based on survey results; develop interventions to address the areas for improvement or institution-specific priority areas; assess the effectiveness of the interventions by comparing survey results pre- and post-intervention; and finally repeat the implementation-assessment-retesting to further improve the design of interventions.

- Practically, when implementing engagement interventions, institutions should follow the process of implementation-assessment-retesting to ensure the effectiveness of interventions. Institutions should collaborate and learn from each other in terms of successful intervention practices, useful assessment tools and appropriate research methodologies.

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[10] Please refer to Appendix A of this research note for a list of participating universities and descriptions of the interventions.
[11] Please see Table 3 of Conway's (2010) paper for items included in the assessment.

V. Can engagement surveys be used for accountability purposes by the government or policy makers to monitor individual institutional performance and to address issues at the sector level?

Colleges[12]

The quality measures traditionally used in the Ontario colleges' accountability framework are focused on outcome measures, including KPIs:

- Graduate job placement
- Student satisfaction survey results
- Graduate satisfaction survey results
- Employer satisfaction survey results
- Student retention rates

While these outcome indicators are considered by the government to be effective accountability measures in the sector, they do not account for the increasing diversity of the college system. Each college has its own mission, size, location and student composition. Some institutional researchers have argued that at a direct comparison of outcome measures among institutions may induce counterproductive competition in the sector. In recognition of the importance of including process measures as part of accountability reporting in the Ontario college sector, 24 additional engagement questions are being piloted as part of the Student Satisfaction Survey (KPI+ survey). It is in the interests of all stakeholders to carefully and critically assess the effectiveness of the KPI+ survey in order to contribute to the creation of a more balanced accountability framework in the sector.

Universities

Ontario universities have been administering and reporting on the National Survey of Student Engagement benchmarks in the accountability framework since introduced in 2006-2007. Participant institutions receive two reports from NSSE after implementation: *Mean and Frequency Comparisons;* and *Institutional Benchmark Comparisons.* The *Benchmark Comparisons* report is the most common way in which universities publish their NSSE results. All Ontario universities present their own NSSE benchmark scores on their institutional websites.

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[12] HEQCO has conducted a number of studies using college KPI data. Recently, HEQCO released a report on what influences college graduates' satisfaction and labour market outcomes. The report is entitled "What are the Influencers of Graduate Satisfaction and Labour Market Outcomes on Ontario College Graduates? An Analysis of Ontario's College Graduate Satisfaction Survey Results". The study looked at whether factors such as institution size, region, program mix and demographics of graduates had an impact on college graduate satisfaction, employment and earnings. The report was written by Ursula McCloy, Research Director and Shuping Liu, Research Analyst of HEQCO. The report can be found at http://www.heqco.ca/SiteCollectionDocuments/FINAL%20Influencers%20ENG.pdf

Since the incorporation of NSSE into the MYAA frameworks, there has been a discussion among policy makers regarding the appropriate applications of NSSE to university accountability. The government's intention is to obtain information on the level of and improvements to institutional engagement levels, with expectation to see positive movements in NSSE scores over time.

Although NSSE has made it clear that the results are not to be used for ranking purposes, the media has been using NSSE results for comparisons among institutions. *Maclean's* has published its annual comparisons of NSSE benchmarks among Canadian universities since 2006, claiming that the results would be useful for prospective students in choosing the right university.[13] However, institutional researchers have been arguing that NSSE results should not be used as direct indicators of institutional performance. The variations in NSSE results among institutions may be due to factors unique to each institution. The findings from the *NSSE National Data Project* (Conway et al., 2011) have confirmed the legitimacy of this argument.

Evidence from the NSSE National Data Project

Within-institution analysis of NSSE results by student subgroups[14] and programs proved very useful for academic planning purposes, but some of the analysis is limited by small sample sizes. The *NSSE National Data Project* (Conway et al., 2011) pooled NSSE data from multiple universities across Canada to produce an analysis of NSSE results by student subgroups and programs. Specifically, this project used 2008 or 2009 student-level NSSE response data obtained from 44 universities to:
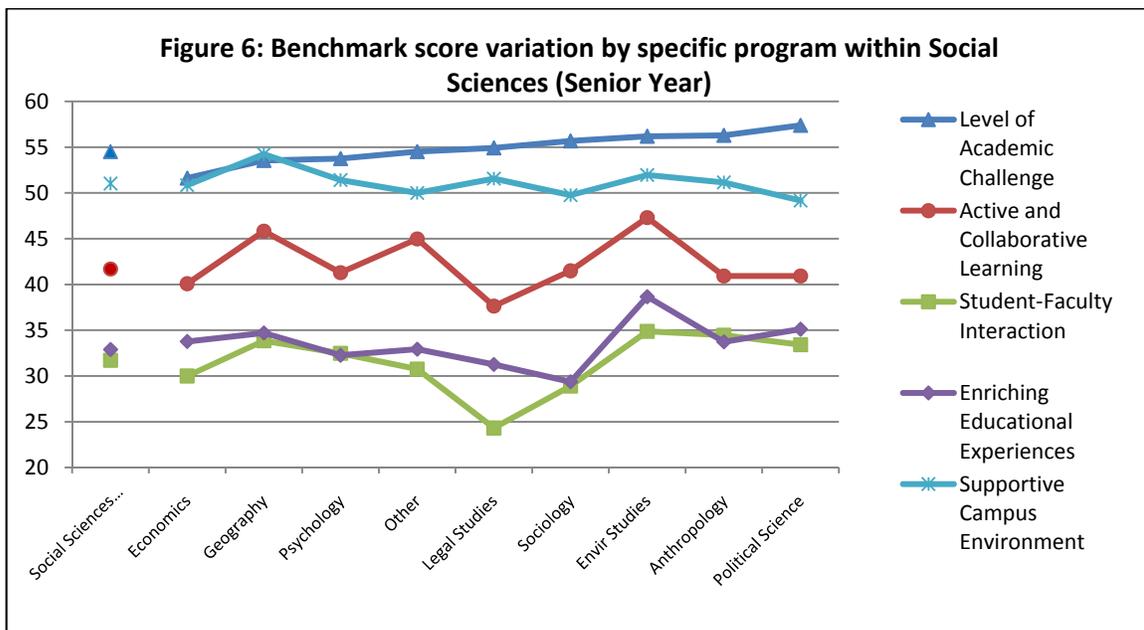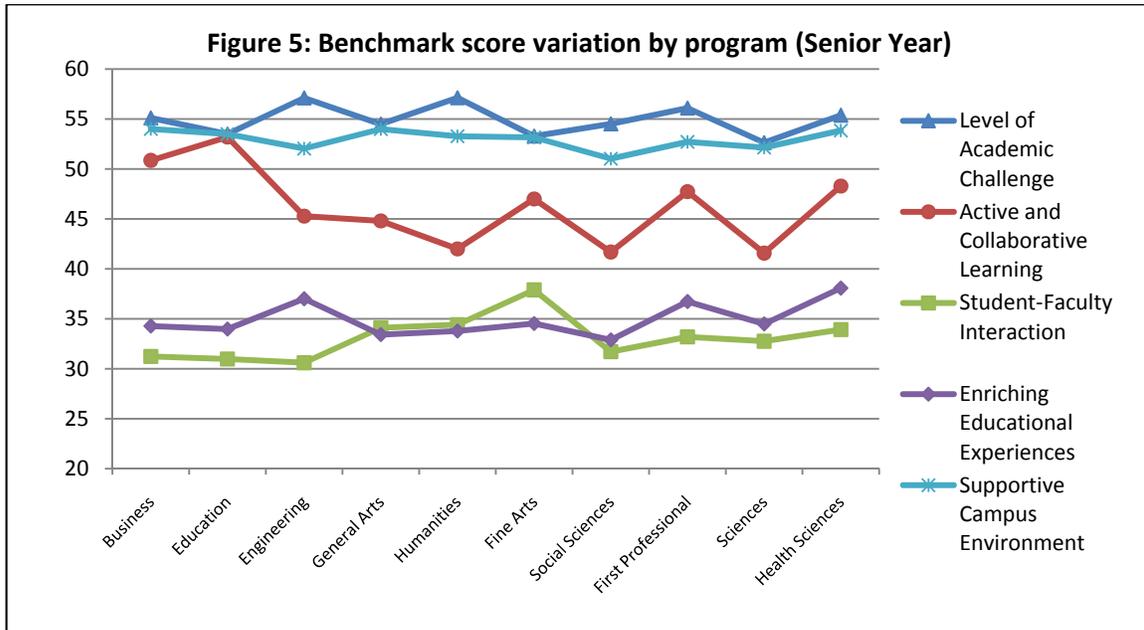
- Produce university-by-university (not peer group) program-level (not university-wide) engagement reports to support tailored program-level response
- Produce numerous student-subgroup (not overall) engagement reports to identify student-based engagement differences and corresponding service and academic issues
- Identify and quantify factors contributing to engagement variation (students, programs and institutions) to focus effort on meaningful activities
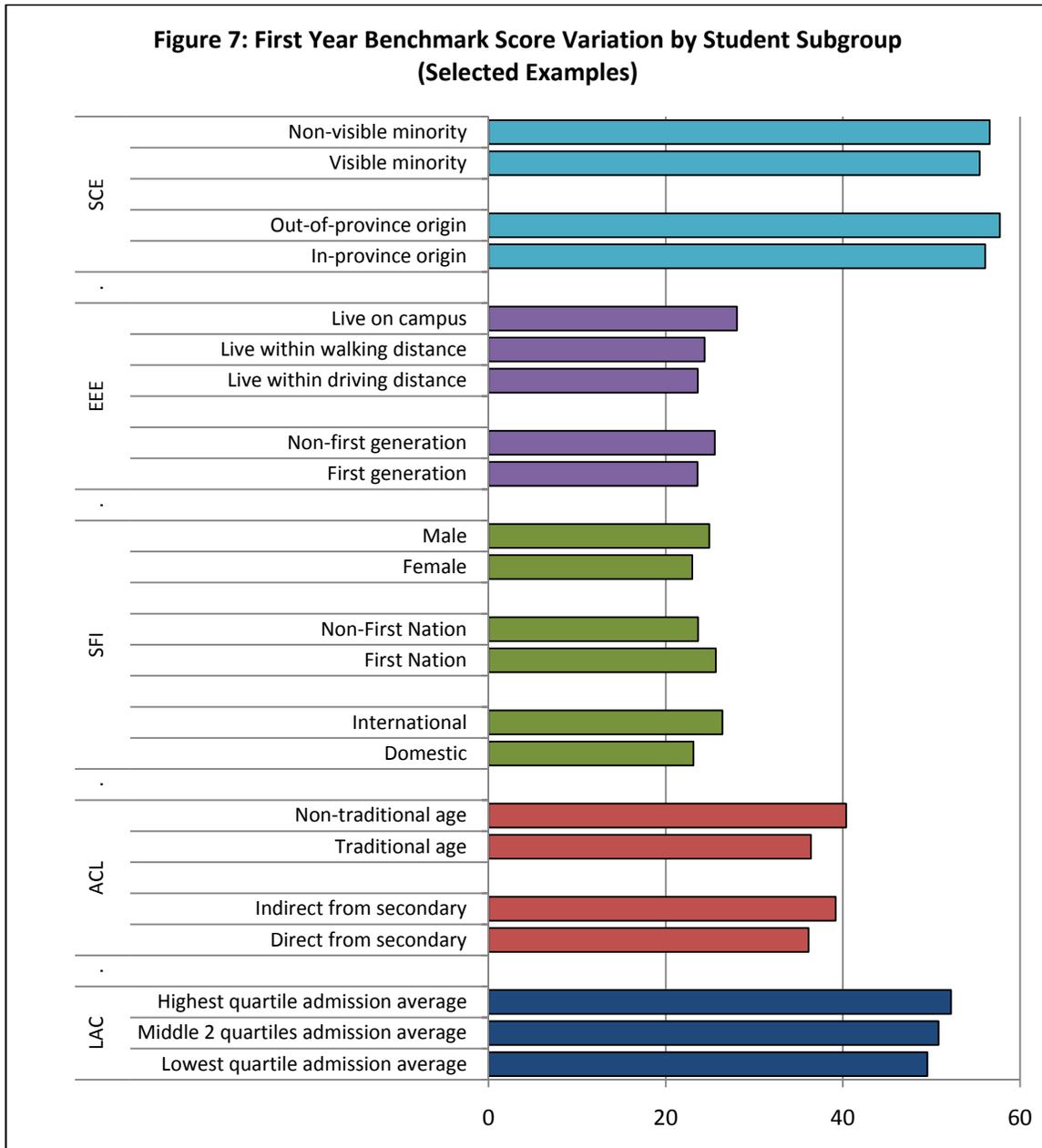
The NSSE response data were matched with a limited number of additional data fields obtained from the student records system of each institution. The matching enabled comparisons of program-level and student subgroup-level engagement results and provided control variables for the regression models. Multiple regression models were constructed to examine the extent to which student, institutional and/or exogenous variables (e.g., location and size of the university) explain variations in NSSE benchmarks at both the student and institutional levels.

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[13] http://oncampus.macleans.ca/education/2010/02/15/2010-university-student-surveys-complete-results-2/

[14] Student subgroups include: visible minorities, out-of-province students, commuters/on campus students, first generation students, male students, students identified as First Nation, international students, non-traditional age students, transfer students, students with high/medium/low admission averages).

The analysis reveals considerable engagement variation in both program level and student subgroup responses. For example, as shown in Figure 5 and Figure 6 (senior-year benchmarks), there exists substantial benchmark variation by program at both the general discipline and specific program level, especially in the *Active and Collaborative Learning(ACL)*, *Student-Faculty Interaction(SFI)*, and *Enriching Educational Experiences(EEE)* benchmarks. Figure 7 provides a few examples of first-year benchmark variation by student subgroup.

Figure 5: Benchmark score variation by program (Senior Year)

Figure 6: Benchmark score variation by specific program within Social Sciences (Senior Year)

**Figure 7: First Year Benchmark Score Variation by Student Subgroup
(Selected Examples)**

Variations in NSSE benchmark scores are associated with many factors. Regression analysis was performed to measure the degree to which variation in the engagement level is accounted for by one or more engagement drivers (e.g. institutional, program and student characteristics). In institution-level regression models, student characteristics, program mix and institution size explain over 80 per cent of the benchmark variations among institutions. However, the variations in benchmark scores among students are much more difficult to explain. Based on institution-level regression results, NSSE benchmarks are generally <u>lower</u> for an institution if there are more:

- male students
- first generation students
- Aboriginal students
- international students
- out-of-province students
- students with high school grades in the lowest quartile
- students enrolled in a Social Sciences program
- large-size university

The regression models permit a number of conclusions. First, student characteristics, program mix and institutional character each contribute to a statistical explanation of engagement variation, indicating that comparisons should take these factors into account. The apparent wide variation in institutional engagement scores is reduced considerably when student characteristics, program mix and institutional size are controlled. Second, each engagement benchmark requires a distinct statistical explanation: factors important to one benchmark are quite different from those important to another. Third, Francophone and Anglophone institutions differ with respect to certain key engagement dynamics. Fourth, the models provide a basis for defining the institutional contribution to engagement and the scope of institutional potential to modify engagement level.

What we have learned:

- Engagement measures need to be incorporated into Ontario colleges' accountability framework in addition to the existing KPIs. It is in the interests of all stakeholders to carefully and critically assess the effectiveness of KPI+ survey in order to contribute to the creation of a more balanced accountability framework in the sector.

The *NSSE National Data Project* has shown that variations in NSSE benchmark scores among institutions are associated with many factors, including but certainly not limited to, institutional characteristics, student composition and program mix. This suggests engagement survey results should not be used as direct indicators of institutional performance as a simple ranking or direct comparison of the survey results among institutions may create misleading results. Rather, each institution should be accountable for its own particular benchmark scores, that is, the difference between actual and predicted engagement benchmark scores. This difference can be viewed as a proxy measure for institutional engagement "contribution" after controlling for student characteristics, program mix and institutional size.

VI. Conclusions

The Ontario government and public PSE institutions have devoted considerable time and effort incorporating student engagement measures into the province's PSE system. HEQCO's four studies on student engagement have provided evidence for the following three questions that relate to measures of student engagement:

(1) Are the engagement survey tools currently used valid and reliable in the Ontario context? Can the engagement measures predict learning outcomes of students?

(2) Can engagement surveys be used to guide and inform institutional management and planning by colleges and universities?

(3) Can engagement surveys be used for accountability purposes by the government or policy makers to monitor individual institutional performance and to address issues at the sector level?

The lessons learned from a number of HEQCO-funded projects have the following implications to Ontario PSE Institutions and the government:

What we have learned…	For Ontario PSE Institutions…	For Ontario Government…
Student engagement measures have positive relationships with learning outcome measures.	• Continue to participate in engagement-related surveys.	• Continue to require the administration of engagement-related surveys and report on survey results as part of the accountability framework.
Detection power of NSSE is not strong enough to capture changes imposed by small-scale interventions. CLASSE, the course-based version of the survey, has stronger detection power when assessing course-based interventions by institutions.	• Use a combination of appropriate survey tools in the process of assessing the effectiveness of small-scale interventions.	• The accountability frame work in Ontario should continue to focus on documenting quality efforts rather than outcomes. "It would be premature to move immediately toward an outcomes-based accountability regime."(Conway, 2010).
Longitudinal surveys and data linking provide rich information that allows institutions to gain deeper understanding of student engagement, which in turn can aid in the design or improvements of engagement strategies.	• Improve engagement survey data collection: increase sample size, response rate and promote longitudinal data collection. • Survey sample selection should capture or oversample targeted student subgroups. • Enable data linking between survey responses and administrative data.	• Support institutions' initiatives on engagement-related data collection • Promote and support data and information sharing among institutions.

What we have learned…	For Ontario PSE Institutions…	For Ontario Government…
Appropriate survey tools and research methodologies are needed in the process of engagement intervention implementation and assessment.	• When implementing engagement interventions, institutions should follow the process of implementation-assessment-retesting to ensure the effectiveness of interventions. • Institutions should collaborate and learn from each other in terms of successful intervention practices, useful assessment tools and appropriate research methodologies.	• Promote and support information sharing among institutions on best practices in the utilization and interpretation of engagement measures.
Variations in engagement results among institutions are associated with many factors, including but not limited to, institutional characteristics, student composition and program mix. A simple ranking or a direct comparison of engagement results among institutions may create misleading results.	• Each institution should focus on its own findings to identify areas for improvements and to direct engagement strategies in light of its own missions and goals.	• Avoid direct comparisons and rankings of engagement measures among institutions, instead focus on how institutions are using engagement measures for quality improvement in the context of institution-specific missions and goals.
Each institution should be accountable for its own particular benchmark scores, that is, the difference between actual and predicted engagement benchmark scores. This difference can be viewed as a proxy measure for institutional engagement "contribution" after controlling for student characteristics, program mix and institutional size.	• Each institution should focus on improving its actual engagement benchmark scores against its predicted scores. • Institutions should demonstrate its efforts to develop, document and share effective engagement field and assessment practices.	• Mandate on-going data collection on student engagement measures by implementing engagement related surveys such as NSSE and KPI+. • Incorporate actual v.s. predicted NSSE benchmark scores in the MYAA framework. • Require documenting and sharing of engagement improving efforts and assessment practices at institutions.

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Appendix A

Summary of interventions, measurement tools, and dependent measures used in the NSSE interventions project[15]

Institution	Intervention	Description	Goal	Measurement Tools (in addition to NSSE)	Dependent Measures (in addition to NSSE)			
				CLASSE	Other Surveys	Grades	Attrition	Other
Carleton University	Development of a Teaching Assistant Mentorship Model	Teaching assistant mentors were assigned to 5 departments to provide training and support to the department's teaching assistants.	To improve TA-related student experience in response to dissatisfaction with teaching assistants as measured through the Canadian University Survey Consortium (CUSC) survey and 2006 NSSE.			X		
University of Guelph	Supported Learning Groups in High Risk Courses	Senior student peers provided out-of-class group study and review sessions in high-risk first-year courses having either high dropout/failure rates and/or low grades.	To improve the first-year experience through increased retention and the development of learning skills.	X		X		
University of Ottawa	Faculty of Social Sciences Course-Based Learning Community	First-year students self-selected to participate in group meetings and workshops, with senior student mentoring support.	To address new student integration into a large Faculty and large university as prescribed in the strategic plan.			X	X	
Queen's University	Enhanced Student-Faculty Interaction in a Large Introductory Course	Students in a very large introductory course (Psychology Department) self-selected to participate in the "Discovery Project" – a series of small group enrichment sessions dealing with research and professional practice.	To compensate for limited student-faculty interaction opportunities in Introductory Psychology and to better integrate research issues into course content.	X	Custom qualitative survey on students' perceptions of the intervention	X		Academic Program Choice
University of Western Ontario	Improvement of Science Literacy Through Course Re-Design	Fully integrate the development of science literacy skills into two large first-year Biology courses.	To improve student experience and the faculty's academic plan commitment to improved teaching and learning.	X	Online science literacy assessment test	X		

[15] Source: *Table Two: Summary of Assessment Designs by Project*, Conway et al. (2010).

Institution	Intervention	Description	Goal	Measurement Tools (in addition to NSSE)	Dependent Measures (in addition to NSSE)			
				CLASSE	Other Surveys	Grades	Attrition	Other
Ryerson University	Improving Writing Skills in Selected Academic Programs	A range of curricular changes and service enhancements were incorporated into required first-year courses to improve writing skills competencies and highlight writing skills as a learning outcome.	Writing competency had previously been identified as a faculty objective based on NSSE results and is integrated into Ryerson's priority-setting and accountability processes.		Student self-assessment of writing skills	X	X	
Wilfrid Laurier University	Peer Learning Program for Literacy, Research and Writing Skills	Peer-delivered learning program designed to improve the information literacy, research skills and writing skills of students in two introductory writing-intensive courses.	To address concern over student ability to make the transition to university and university-level writing.			X		
University of Waterloo	Curricular Re-Design via a Teaching Excellence Academy	Teaching Excellence Academy provides faculty members with intensive training on course design.	To meet provincially established degree level expectations.			X		
University of Windsor	Intrusive Faculty-Wide First-Year Advising	First-year students in the School of Business received a significantly enhanced advising program consisting of regular contacts with faculty and senior peers to deal with academic and social issues.	Address concern over the level of social and academic integration of students as reflected in NSSE results and in the expectations-experiences gap between BCSSE and NSSE.	X				
Queen's University	Computer Enhanced Tutorial and Academic Support Integrated Across Courses	Fourth-year students in the Electrical Engineering program were provided access to on-line real-time extended-hours tutorial support services.	Address a general concern over the level of academic support and curricular integration, and program-specific concerns with NSSE results.	X	X	X		