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Introduction

The Scholarship of Teaching and Learning (SoTL) can be described as a slow but growing movement in higher education, particularly in North America. Drawing on the research literature on SoTL, this issue of Centennial College's Teaching and Learning Innovation Digest will explore the SoTL movement in post-secondary institutions in North America, specifically in Canada. The digest will begin by defining SoTL, look at the history of the SoTL movement, and the benefits and challenges associated with it. Next, the digest will explore how various Canadian institutions of higher learning, including Centennial College, have sought to build an organizational culture that supports and fosters SoTL. To conclude, the digest will showcase the teaching and learning research of various employees at Centennial College.

Defining Scholarship of Teaching and Learning (SoTL)

Notable American faculty developer Maryellen Weimer (2006) argues that faculty looking to improve their teaching have too often ignored the existing teaching and learning research; a sentiment echoed by other educational scholars (Bok, 2006; Evers et al., 2009). The question of why this is the case needs to be examined from the larger context of teacher development in higher education. It is well documented that most teachers in post-secondary institutions have little to no formal teacher training experience (Evers et al., 2009, 2010). Very few go to teachers college (or its equivalent) and few universities and colleges in Canada offer teaching certificates in higher education, however this trend is changing. The reality is that most faculty learn to teach in a haphazardly fashion; simply learning as they engage in teaching (Evers et al., 2009). Findings from a Higher Education Quality Council of Ontario (HECQO) funded research study that looked at faculty engagement in teaching development activities in six universities in Ontario found that the majority of faculty surveyed use trial and error and consulting colleagues as the primary ways to learn about teaching (Evers et al., 2010). This is particularly true for those who started in higher education when there were no teaching and learning centers and/or teacher education programs. Many post-secondary teachers reported that when they were hired there was an expectation that they would naturally know how to teach (Evers et al., 2010).

> **"The unfortunate reality is that even "professors with years of teaching experience often make commitments to certain pedagogies without ever questioning their own evolving and unfolding understanding of a particular phenomenon and their students' ability or inability to grapple with content area the professor has already mastered (Gayle et al., 2013: p. 81)."**

The research on teacher development contends that effective educators make intentional efforts to continually reflect on their classroom practices, with the aim of learning from those experiences about what worked well and what did not. Often teachers relied on what Brookfield (1995) terms an autobiographical lens and a student lens to assess their teaching. While the autobiographical lens is useful to becoming a critically reflective teacher, Brookfield (ibid) cautions against relying solely on it. He argues that doing so can prevent teachers from discovering their less obvious shortcomings and prohibit them from improving or understanding teaching and learning because as teachers we are influenced by our own assumptions and beliefs.

Stephen Brookfield's (1995) book "Becoming a Critically Reflective Teacher" discusses four lenses to view faculty development and teaching:

1. Our autobiographies as learners and teachers: This is often the first step. This self-assessment allows teachers to continually increase their own understanding or personal knowledge of teaching
2. Seeing yourself through students' eyes: This makes teachers aware of those actions and assumptions that either confirm or challenge existing power relations in the classroom; it helps ensure the latter comprehend the meanings we intend.
3. Our colleagues experience
4. Theoretical literature

More and more educators are turning their autobiographical reflections into formal educational research projects (Flatt, 2005). However, the reality is that the majority of faculty are not conducting SoTL research (Evers et al., 2010; Timmerman and Ellis, 2016).

Good teaching is seen as teaching that results in enhanced student learning and other desired student outcomes that would not have occurred in the absence of good teaching. Good teaching has been defined and operationalized in various ways (i.e. student satisfaction ratings, peer observations judgements self-reflective portfolios) and usually supports department, college, and institutional missions and objectives (Ruutmann and Saar, 2017).

Scholarly teaching goes further than what is required for good teaching. It involves taking a scholarly approach to teaching as is done in other areas of knowledge and practice. Scholarly teachers see teaching as a profession and the knowledge upon which teaching and learning is grounded as a discipline in which to develop expertise. Scholarly teachers reflect on their teaching, read and apply the literature on teaching and learning in their discipline and/or more generally, use assessments techniques to evaluate their classroom, and discuss teaching issues with colleagues. The conception of scholarly teaching is related to what Boyer (1990) labeled the *Scholarship of Teaching* (Ruutmann and Saar 2017). Scholarly teaching is the foundation of SoTL – particularly scholarly teaching that focuses on the individual's own classroom practice and experience (Potter and Kustra, 2011; Healey et al., 2013). Diamond (2002) argues that SoTL's concerns extend beyond scholarly teaching toward wider issues of institutional practice and educational issues that affect human society at all levels.

> **"The Scholarship of Teaching and Learning is the development of scholarly knowledge about teaching through reflection, conducting research and sharing expertise; not only in order to improve practice within one's own classroom, but also beyond, to the institution and the field" (Evers et al., 2010: p. 31).**

In general, SoTL includes rigorous, systematic and evidence-based study of student learning; the understanding and improvement of student learning and/or teaching practice; commitment to disciplinary and/or interdisciplinary peer review and appropriate public dissemination; impact beyond a single course, program or institution –advancing the field of teaching and learning to build collective knowledge and ongoing improvement (Ruutmann and Saar, 2017) The central objective of SoTL is to add to the teaching and learning literature so that this shared knowledge can lead to improvement in teaching and ultimately enhance learning for students (Ruutmann and Saar, 2017). Despite the differences in the academic community when it comes to a definition of SoTL, they all share an understanding that scholars investigate and share publicly the impact that varied teaching methods have on students' learning (Grauerholz and Zipp, 2008).

Given the above definitions it is important to note that scholarly teaching is not the same as scholarship of teaching and learning. According to Evers et al., "Scholarly teaching requires faculty to incorporate pedagogical literature into their teaching and engage in reflective practice about their own teaching. Scholarship of teaching and learning takes this process of reflection further by requiring that research performed to evaluate teaching is subject to the same review process as discipline specific research" (2010: p. 30). Shulman (1999) points out that "'scholarship' has three attributes: it is public, it is an object of critical review and evaluation by members of one's own community, and members of one's community begin to use and build upon and develop those acts of

mind and creation" (p.15). Thus, reflecting on our teaching is the first step in the process of transforming teaching into SoTL. The key to this transformation is to develop and apply more systematic methods to collect and analyze students' reactions or work and then to share publically with members of the teaching community findings from this process. The last step is extremely important since "good SoTL practice requires that both the process and the products of inquiry are public so that colleagues can critique and use the work" (Felten, 2013: p. 124).

SoTL is not a magical solution that will allow educators to uncover a universal teaching method for all students in all institutions and in all disciplines. The philosophy of SoTL emphasizes that teaching is not simply an accumulation of universally effective methods. Rather it involves reflection on our teaching practices, intellectual consideration with our peers as to the elements of the learning process, ensuring that we know about assignments and test creation, student motivation, areas of difficulty in our discipline and alternative models of assessment (Flatt, 2005).

Miller et al. (2004) argues that every teacher should strive to engage in scholarly teaching. This requires them to keep abreast of their field's attention to teaching. However, if teaching is to continue to be effective and considered scholarly, teachers must take part in the scholarship of teaching and learning. This requires faculty to frame and systematically investigate questions related to students learning, the conditions under which it occurs, what it looks like and so forth and do so with an eye to improve practice beyond their own classrooms. This highlights the importance of examining work being conducted in a range of disciplines in order to fully appreciate the pedagogical scholarship currently being conducted by colleagues within classrooms, institutions and beyond.

There is increasing realization in academia that there is a need for scholarly research on teaching and learning. This realization is couched in the belief that scholarly evidence-based knowledge about teaching and learning is a crucial prerequisite to addressing the major challenges facing academia. There is the belief that this knowledge needs to emerge from academics from all disciplines not just from those in schools of education. Importantly, this knowledge should be cumulative, building on existing knowledge and should be publicly shared so as to invite critique, necessary to ensure its rigour and use (Pace, 2004; Wuetherick, Yu and Greer, 2016).

The History of SoTL

The origins of Scholarship of Teaching and Learning (SoTL) practices date back to Dewey's work in education in the 1960s, which was called the theory of inquiry (Evers et al., 2009). Lesser known figures like Cross (1996), called for faculty to use their college classrooms to undertake research on teaching and learning for the purpose of finding more effective teaching methods and to create a body of knowledge about college teaching that would maximize learning (Bennett and Deewar, 2012). However, it wasn't until the 1990s when Boyer (1990) introduced the concept of Scholarship of Teaching (SoT) in his ground-breaking work *Scholarship reconsidered: Priorities of the professoriate*, that it became more widely known. Boyer (ibid) introduced four dimensions to what is considered scholarship at the university level

1. **Scholarship of discovery** (what we have typically called research)
2. **Scholarship of integration** (giving a larger meaning to our research in an interdisciplinary context)
3. **Scholarship of application** (where we apply our research to the world)
4. **Scholarship of teaching** (where we apply to our teaching the same rigors of scholarship that we do to our research)

Boyer (ibid) recognized that the research heavy focus in universities minimized the importance of teaching (and service) and that in order to raise the status of teaching and service it needed to be recognized as scholarly activities equal to that of research.

> **In the words of Boyer (1990) "we (in Higher Education) must move beyond the tired old "teaching versus research" debate and give the familiar and honorable term 'scholarship' a broader and more capacious meaning" (p. 16).**

SoTL arose in part out of the need to address the imbalance between research, teaching and service model in universities. Traditionally, universities have weighted research significantly more than the other two aspects. Therefore, despite the expectation of good teaching at these institutions it is rarely privileged. Boyer (1990) felt strongly that teaching that contributed to the enlightenment of others should be considered scholarly work in the same way as more traditional or disciplinary research. Servage (2009) points out that Boyer (1990) considered the triumvirate model of research, teaching, and service adopted by universities a failure not only because it failed to "capture or facilitate the breadth and complexity of scholarly work but had also led teaching and research to become antagonistic competitors for scholars' time and attention" (Servage, 2009: p. 28). Boyer (1990) made a strong case for removing the barriers between teaching, research and service. He pushed for the application of rigorous and scholarly approach to understanding teaching and learning processes and for assessing the improvement gained by introducing new methods and techniques (Michelson, 2016)

Boyer's interest centered mainly on teaching, but in the late 1990s SoTL advocates sensing that SoTL had stalled, added the concept of "learning". The *Scholarship of Teaching* now became the *Scholarship of Teaching and Learning* and the SoT acronym became SoTL. The concept of learning was added to include the focus on student learning as well as teaching (Boshier, 2009; Boshier and Huang, 2008). Three decades on since Boyer's (1990) seminal definition of *Scholarship of Teaching* the concept has evolved with the addition of the term "learning". Despite the addition of learning there is still some criticism that SoTL continues to be privilege teaching at the expense of learning (Boshier and Huang, 2008).

While Boyer (1990) cannot be credited with defining SoTL what he can be credited with is laying the groundwork for it. His identification of key characteristics of the scholarship of teaching has served as the foundation for future work. SoTL continues to be an evolving concept with others before and after Boyer contributing to its evolution (Bennett and Deewar, 2012). Notably, the work of members from the Carnegie Foundation for the Advancement of Teaching like Pat Hutchings and Mary Huber have put forth a more capacious view of SoTL; one that has widened the scope of work undertaken under the banner of SoTL. The continuum of SoTL ranges from modest investigations that document the teaching and learning in a single classroom to more elaborate research designs that go well beyond a single classroom (Bennett and Deewar, 2012; Mathison, 2015).

More institutions and organizations around the world began to support and fund SoTL work, which gave rise to publications and the formation of academic societies that focused on SoTL (Mathany et al., 2017). For example, 2004 was a watershed year marking the founding of the *International Society for the Scholarship of Teaching and Learning (ISSOTL)*, and in Canada the establishment of the *Society of Teaching and Learning in Higher Education (STLHE)* (Simmons and Poole, 2016). These societies made advancing

SoTL one of its primary strategic directions. This meant communicating the importance of SoTL and developing a rationale and guidelines for post-secondary institutions. Michelson (2016) points out that the earlier SoTL work focused on the philosophy of SoTL and the manner in which researchers could address questions regarding educational practices in a scholarly way (Becker and Andrews, 2004). More recent works have addressed the impact of SoTL at the institutional, national and disciplinary levels (Michelson, 2016; Poole, 2007; Hutching et al., 2011; McKinney, 2007)

Over the last two decades SoTL has gathered a large following, growing into an international movement dedicated to improving students learning in higher education. The work of Servage (2009) has underscored the following underlying reasons for the growth of SoTL:

- The advancement of the discourse on effective teaching in higher education, which was an impetus for Boyer's 1990 book *Scholarship reconsidered; Priorities of the professoriate*.
- The greater legitimacy and status given to teaching and learning in higher education by making it a subject of "scholarly" attention and inquiry.
- The increased competition for student revenue (tuition) has meant greater pressure for institutions to pay greater attention to teaching as part of their mandate to attract and satisfy students.
- The increased diversity of student populations has led to a an emphasis on teaching in ways that meet the range of student learning needs, especially those student groups that have been less likely to pursue post-secondary education or succeed when they do.
- The expanded emphasis on assessment for accountability purposes in higher education.

In Canada SoTL is more grassroots in nature (i.e., campus-to-campus) due in large part to the lack of substantive funding programs, foundations and granting councils supporting this work (unlike that of the United States where formal funding of SoTL is provided by the organizations like the Carnegie Foundation) (Simmons and Poole, 2016; Kenny et al., 2016). Despite the more grassroots approach to SoTL, it is becoming an increasingly recognizable aspect of scholarly work at many Canadian institutions of higher learning. This has required a cultural shift in higher education; one that is accompanied by academic norms and values that emphasize the importance of teaching and learning and support for faculty who engage in SoTL (Schwartz and Haynie, 2013). Leadership at post-secondary institutions in Canada, as well as teachers, researchers and educational developers all play a significant role in advancing this cultural shift.

Despite this growth in SoTL, it is also worth noting that most faculties working in higher education do not know what SoTL means (Boshier, 2009). This is particularly true for faculty working at community colleges, where the history of scholarly research has only recently emerged as part of the institutional culture (Ford, 1999; Shamai and Kfir, 2002).

SoTL at Universities and Community Colleges

While universities are heavily focused on research, this is not the case for community colleges where the focus has been on training and teaching. As such, universities and community colleges have traditionally held different perspectives on research. Over time community colleges have become a site for the growth of applied research and more recently SoTL research (Simmons and Poole, 2016; Vaughan, 1991).

Colleges have and continue to contribute to SoTL conversations in Canada and it is important that they continue to not only be included, but also be considered equal partners with universities in these conversations. This will ensure that SoTL is not solely built on the model of universities. This is important given the institutional differences between colleges and universities (Simmons and Poole, 2016). For example, as noted above, scholarly research is embedded in the structure and culture of universities, whereby this has traditionally not been the case for colleges, particularly community colleges. Besides the fact that community colleges have a different workload model than that of universities, whereby scholarly research is built into the faculty workload at universities, there is also greater access to funding

and appropriate resources to support research at universities, which is not the case for community colleges (Ford, 1999; Palmer, 1994; Shamai and Kfir, 2002). There is a well-established research culture and appropriate policies and practices that validates and supports scholarly research in universities. Additionally, the majority of faculty at universities have some degree of knowledge and/or level of experience with scholarly research. This is due to the fact that teaching at university requires the majority of faculty to have an advanced graduate degree (i.e. PhD) where scholarly research is usually a requirement (Ford, 1999).

On the other hand the focus of community colleges has been on teaching and as such these institutions are "uniquely positioned to lead the way in developing innovative research that contributes to the development of that scholarship, sharing the results of their research with colleagues and engaging in discussions about what they know best –teaching and learning." (Miller et al., 2004: p.30).

In fact, an institutional faculty sub-culture that promotes SoTL has been shown to influence growth and improvement in community college environments (Locke and Guglielimino, 2006).

The early work of Vaughn (1988, 1991) on scholarship in community colleges argued that expanding the term scholarship to include many of the activities undertaken in community colleges would favourably change their reputation as institutions of higher learning. For example, Palmer's (1992) research on "scholarly products" in American community colleges included exhibitions, works of art and technical proficiencies. Clara Ford (1999) has argued that given the current institutional structure of community colleges it is not necessary or realistic to expect they would replicate the 'publish or perish' approach to scholarship. This is not to suggest that community colleges not undertake rigorous research, rather changes should be made to foster an atmosphere of research and scholarship in community colleges. Changes that would grant faculty time to pursue research which enhances teaching –whether they are published or not- and would be encouraged, supported, recognized and rewarded by these institutions (Ford, 1999; Ocean et al., 2019).

Community colleges serve an increasingly diverse student population that has many critical needs that are in many ways different from the student population at universities (Ford, 1999). SoTL research undertaken at community colleges would reflect the pragmatic needs of this population and environment

and thus it is worth repeating that it is important they be included as equal partners in the SoTL movement in Canada if the goal of SoTL is the success of all students.

Despite the differences between universities and colleges, the best practices that build and foster SoTL at the institutional level are similar for both. According to the work of Hutchings et al. (2011), the following are a number of key practices for supporting SoTL at the institutional level:

- Understand, communicate, and promote an integrated vision of SoTL.
- Support a wide range of opportunities to cultivate skills and habits of inquiring into teaching and learning.
- Connect SoTL to larger, shared agendas for student learning and success.
- Foster exchange between the campus SoTL community and those responsible for institutional research and assessment
- Work purposefully to bring faculty roles and rewards into alignment with a view of teaching as scholarly work
- Take advantage to engage with larger, increasingly international teaching commons
- Develop a plan and timeline for integrating SoTL into campus culture and monitor progress
- Recognize that institutionalization is a long-term process

Hutchings et al. (2011) argue that these strategies are designed to align the educational goals of the institution with the principles of SoTL. They also contend that these strategies should not be viewed as prescriptive, but rather be considered a guide that can be tailored and adapted to each institution.

The Benefits of SoTL

The literature is clear on the general benefits of SoTL for teachers who undertake such work.

- Promotes flexibility, empowerment and transformation for teachers (Boyer, 2019; Cochran-Smith and Connell, 2006; Metler, 2006; West, 2011)
- It supports reflective practice, critical to institutional and professional practice (Evers et al., 2009; Kreber, 2006; Wuetherick et al., 2016)
- Can help foster collegial connections across disciplines and institutions furthering opportunities to network, share experiences, engage in critical dialogue, learn from one another and collaborate to solve problems (Bennett and Dewar, 2012; Mathison, 2015; Miller-Young et al., 2016; Timmermans and Ellis, 2016; Veerwood and Poole, 2016)
- Increases awareness of the variety of teaching methods available and facilitates the development of new knowledge, which can cultivate an inquiry mindset and stimulate change in teaching practice (Mathison, 2015; Williams et al., 2013; Wuetherick and Yu, 2016)
- It resonates with the intrinsic motivation of teachers to deliver teaching and learning in the best interests of their students (Mathison, 2015)
- It promotes learner-centered teaching (Kember, 2002)
- Engages students in more discussion about their own learning (Marquis and Ahmad, 2016; Mathison, 2015)
- SoTL questions have to gather and analyze evidence that goes beyond grades so it can help drive institutional assessment efforts to be a more meaningful process aimed at curriculum development and pedagogical improvement. (Bennett and Dewar, 2012)
- Fosters lifelong learning (Miller-Young et al., 2016)

Findings on studies that have explored SoTL have reported that scholars involved in SoTL are more likely to report that their involvement has contributed to their excitement about teaching and changed their expectations for both their teaching and students learning. For example, findings from a 2012 national study exploring the current state of SoTL and assessing the perceptions of Canadian SoTL scholars found that the majority of respondents (94%) felt the quality of their students' learning changed since their involvement in SoTL (Wutherick and Yu, 2016). Miller-Young et al. (2016) assessment of Mount Royal University's Nexen Scholars SoTL research program found that faculty who conducted SoTL projects had an "increased attention to their roles as teachers and an increased intentionality in the consideration of their pedagogical strategies and assessments" (p. 59). Additionally, the faculty found that their projects not only brought greater awareness of their student's needs, but also shed light on their own complicity in student's difficulties.

SoTL has also contributed to the design/redesign of courses, particularly the kinds of assessments instructors used in their courses. These findings and others reflect the widespread benefits of SoTL, such as the shift towards more learner-centered teaching approaches (Kember, 2002), improvements in student learning (Trigwell, 2013; Waterman et al., 2010), and positive impact in areas, such as informing program assessment and assisting interdisciplinary work beyond SoTL (Bennett and Dewar, 2013).

The transformative benefits of SoTL are not limited to individual faculty who undertake SoTL, but given that a key aspect of SoTL is to share finding, others also benefit from the work of these scholars. Hence, SoTL informs scholarly teaching practice when shared beyond the researcher's own classrooms. It builds pedagogical knowledge not solely within the discipline of the researcher but also across disciplines. (Boyer, 1990; Miller et al., 2004) Teaching is largely a solitary act, which often serves as a barrier to the sharing of experience and knowledge. SoTL can create space for scholarly informed conversations about teaching and learning. Simmons (2016) points to the HECQO research report "University Faculty Engagement in Teaching Development Activities Phase II" (Evers et al., 2010), which found that the majority of faculty members (75%) at six Canadian universities learned about teaching through conversations with colleagues rather than by researching their own teaching. It is clear that these conversations have the potential to influence the instructional climate and shift the perspective from individuals to the broader institutional culture.

With an increasing number of faculty engaging in SoTL, a faculty subculture that promotes SoTL can emerge which can enable faculty to broaden and deepen their understanding of what it means to ask questions, investigate, try out and share ideas about teaching and learning (Hutchings and Huber, 2008). This subculture has a more academically rigorous knowledge base that contributes to a more meaningful teaching and learning discourse, which can influence continuous improvements in teaching and learning in educational institutions including community colleges (Karabenick and Collins-Eaglin; Boyer et al., 2019). For example, in his study on SoTL research at the University of New Brunswick, Mengel (2016) found that exposure of students, faculty and administrators to and engagement with SoTL, even at a local level, can function as a catalyst and contribute to the growth of SoTL and ultimately to improved student learning at the national level. Meanwhile, the work of Miller et al. (2004) on institutional models for engaging faculty in SoTL found that an orientation program for newly hired faculty, which exposes them to SoTL literature can promote discussion of their own teaching through an SoTL lens. This means not only discussing the how but also the why of teaching practices.

SoTL can also reshape students' views about teaching and scholarship. SoTL positions faculty and students as partners in studying teaching and learning (Auten and Twigg, 2015). Linda Allin (2014) reflects critically on the nature of collaboration between faculty and students in SoTL. She argues that these collaborations have the potential to transform teaching and learning in Higher Education. She recognizes that true collaboration between students and faculty is not easy to achieve because of the hierarchical relationship that attributes greater power to faculty. This is reinforced through social practices of teaching as well as other forms of interaction between students and faculty. Allin (2014) argues that while the reality of greater knowledge and expertise of faculty in many areas should be recognized, it is also important to listen to and understand the voices of students. Allin (2014) encourages the complete involvement of students as co-researchers or researchers in the SoTL. She contends that more could be achieved this way than by working with students simply as sources of data collection.

The Challenges of SoTL

Workload and Time

The current educational environment characterized by heavy workloads, limited resources and increasing and competing expectations have made it difficult for academics to find time to engage with SoTL. As the literature indicates, it is not simply time to undertake SoTL projects that is required, but also the time needed for academics to learn about new research methodologies, theories, languages and modes of enquiry that differ from their own academic or cognate discipline, as well as the administration associated with SoTL (Mathison, 2013). Additionally, when SoTL projects are interdisciplinary and/or collaborative, the logistics of meeting with others and collecting and documenting information is often considered bureaucratically time-consuming, onerous, and burdensome. Subsequently, academics see SoTL as an unnecessary and unwelcome 'add on' to their existing workload (McKinney 2010; Mathison, 2013, 2015). For example, Mathison's (2013) research on academics' engagement with SoTL research at a university in Australia found that academics prioritized disciplinary research over SoTL when it came to workload/time allocation. This was because of their belief that the institution had a more favourable view of disciplinary research outcomes than SoTL outcomes.

For community colleges the challenge of workload and time is even more complicated. While, university faculty workload formulas include time for teaching and administrative obligations and responsibilities and disciplinary research, the workload formulas of community college faculty only include time for teaching and administrative obligations and responsibilities (Ravishankar, 2012). Subsequently, there is little or no time for faculty to pursue SoTL, which further undermines the value and legitimacy of SoTL as a form of scholarship.

The work of McKinney (2010) has offered a number of recommendations for addressing the issue of SoTL as an added imposition on the existing workload/time of academics. For example, these recommendations include connecting SoTL work to existing teaching, research, and community work projects and priorities, and providing internal institutional funding to support SoTL work.

SoTL Funding

Unlike the United States, funding for SoTL has been a particular challenge in Canada. While there is national disciplinary research funding in Canada (i.e. The Social Sciences and Humanities Research Council, Natural Sciences and Engineering Research Council of Canada, The Canadian Institutes of Health Research)

there is no corresponding national funding agency for pedagogical research at the post-secondary level (Poole and Simmons, 2016). Subsequently, unlike the large national research grants for disciplinary research, the majority of SoTL funding in post-secondary institutions is small internal grants (usually not more than $5000) aimed at supporting faculty investigating teaching and learning questions relevant to their own teaching practice. Given the modest amount of funding for SoTL research, there is growing recognition that small research grants typical of SoTL are not sufficient to allow for a more comprehensive and constructive exploration of pedagogical possibilities. Some institutions have increased funding and support to allow for a more sustained line of inquiry.

Lack of adequate funding has been noted by faculty as one of the main impediments to the growth of SoTL. This is particularly true for sessional and contract faculty who are often left out when it comes to access to funding and supports like that of SoTL (Evers et al., 2010: 28). Budgetary constraints have resulted in SoTL being considered a secondary focus in Canadian post-secondary institutions. Subsequently, faculty who engage in SoTL do so largely out of their own interest in teaching and learning. Mengal (2016) contends that financial support for SoTL at the faculty level is extremely important, and without it SoTL will remain in the shadow of disciplinary research.

The work of Simmons and Poole (2016) on the history of SoTL in Canada argued that the lack of substantive funding programs, foundations and granting councils in Canada that supports SoTL work (i.e. there is no government mandated requirements that prepares new faculty and Ph.D students for teaching in higher education) has resulted in the grassroots nature of SoTL, rather than a comprehensive collective movement. Moving forward, if SoTL in Canada is to gain recognition for its important scholarly contributions then there must be advocacy for funding and other supports not solely at departmental, institutional and professional levels, but also at the national level where there are larger funding opportunities.

Community Colleges face steeper funding challenges. According to Ford (1999) many community colleges have no systematic planning or budgetary networks for SoTL activities. The work of Palmer (1994) found that when faculty did receive support for SoTL, it was more likely in the form of collegial support rather than monetary means or release time. Shamai and Kfir (2002) found that the size of colleges was a factor in the development of a research culture. They contend that bigger colleges with more staff and larger budgets not only have more staff members that can pursue research, but also have greater budgetary flexibility and also more tracks, centers and units that can make the formation of research units or research groups possible.

As more Canadian post-secondary institutions put emphasis on teaching, there is greater recognition of the importance of SoTL. Subsequently, more institutional funding and resources have been allocated to developing and supporting SoTL. For example, some institutions like McMaster University

has seen the creation of an institute devoted to SoTL and of faculty positions that combine responsibilities to this institute and to academic departments on campus (Marquis and Ahmad, 2016). Mount Royal University also established the Institute for SoTL separate from the teaching support center (Miller-Young et al., 2016).

Despite these efforts, SoTL does not have the same foothold in higher education as disciplinary and applied research. Financial and other supports for SoTL can work towards creating legitimacy around SoTL work. Financial commitment to SoTL is essential to establishing a culture of continuous improvement in higher education. This financial commitment must be built into the vision and long-term strategic planning process of post-secondary institutions.

Recognition and Validation of SoTL

A significant obstacle to advancing SoTL in higher education is the existing research reward and recognition structure of post-secondary institutions. Repeatedly noted in the research on SoTL is the hierarchical relationship that exists between traditional disciplinary research and that of SoTL, particularly at universities. There is a persistent narrative that SoTL work is less rigorous, easier to perform, and easier to publish than disciplinary research, thus deterring skilled researchers from investing their time and effort in this area (Bennett and Dewar 2012; Boshier, 2009; Felten, 2013; Flatt 2005, Mathany et al., 2017; Potter and Kustra, 2011; Walker et al., 2008). This however, has been contested by other scholars who conclude that the assumption that disciplinary-based research is of higher quality is artificial (Asarta et al., 2018). In fact, it is argued that due to the growing number of scholars from varied disciplines involved in SoTL,a variety of methodologically sound approaches to scholarship has emerged making room for different perspectives and approaches (Mathany, 2017).

Despite the efforts to reduce the hierarchical distance between traditional disciplinary research and that of SoTL, the reality is that SoTL work may not evoke the same respect or carry the same weight as traditional scholarship" (Boshier, 2009; Schroeder 2007). For example, Wuetherick et al. (2016) study on the SoTL landscape at the University of Saskatchewan found that faculty reported there was a lack of validation from departments on their SOTL work and that when it was recognized, it was often "relegated to the status of a 'soft' or 'fluffy' publication or 'secondary' or 'sideline' research and was valued much less than traditional disciplinary research" (p. 67). Furthermore, the study notes that when faculty contributed to SoTL it was not recognized and considered when it came to merit promotion or tenure (ibid). In fact, there is a consistent finding that SoTL is not often rewarded or recognized in consideration of career progression (Mathany et al., 2017). There has been less recognition of teaching in higher educational institutions particularly in universities where research is often rewarded more often and more highly than that of teaching (Mathison, 2015; Marquis 2015). For example, promotions and appointments which are considered the most coveted rewards are often associated with discipline-specific research. Meanwhile, teaching awards are associated less so with appointments and promotion and are thus considered less valued when compared to how research is rewarded (Mathison, 2015; Trigwell, 2013). This is reinforcced by the limited time faculty have to purse SoTL and by the modest funding associated with SoTL, particularly external funding.

When SoTL is recognized and validated there is variation within and between institutions. At some institutions, SoTL falls solely within the realm of teaching when it comes to how it is evaluated for the purposes of tenure and promotion. Essentially, it functions as evidence of teaching effectiveness and of going beyond scholarly teaching. Others downgrade

SoTL publications, with publication in interdisciplinary SoTL journals viewed less favourably than publication in a discipline specific journal. Essentially, SoTL publications are viewed as little more than an addendum to traditional disciplinary research publications (Bennett and Dewar, 2012; Mathany et al., 2017).

At the other end of the spectrum there are institutions that fully embrace SoTL's inclusion as research (Bennett and Dewar, 2012). Institutional frameworks that recognize and reward faculty involvement in SoTL, particularly hiring and promotion processes, can go long way in encouraging and supporting faculty involvement in SoTL (Williams et al., 2013; Mengel, 2016). Wuethrick et al. (2016) argue that through increased participation in SoTL throughout the academic community and through the inclusion of language around SoTL as an aspect of faculty evaluation, tenure, promotion and institutional teaching award criteria, the legitimacy and visibility barriers affecting SoTL work can be reduced.

Historically, scholarly research has not been a focus or expectation of those working at community colleges. As such, there has been no institutional framework for recognition or reward of scholarly research, including SoTL (Boyer, 2019). So while, universities and community colleges share similar obstacles to advancing SoTL (i.e. lack of time, training and incentives), these obstacles are steeper for community colleges (Shamai and Kfir 2002; Ford, 1999). This is largely due to the fact that universities have existing structures for reward and recognition of research, (albeit disciplinary research rather than SoTL), while little to no comparable structures exist in community colleges (i.e. no process of tenure or promotion that recognizes scholarly research; no research departments/units other than applied research at some community colleges). In fact, there is a devaluation of the knowledge of community college faculty that stems from the dominant view that colleges are inferior to universities, due in part to the lack of research by community college faculty (Ford, 1999; Ocean et al., 2018). As Ford (1999) points out, this narrow view ignores the creative innovative and dynamic teaching that is the trademark of community colleges. Ford (1999) and others (Palmer, 1992; Vaughan, 1991) argue that research and scholarship must be redefined to encompass many activities that are already being undertaken in community colleges. Vaughan (1988, 1991) asserts that expanding the term scholarship would have the added benefit of favorably changing the reputation of community colleges as institutions of higher learning. Hence, for community colleges, advancing SoTL may first mean challenging the dominant view that scholarship and/or research does not take place in community colleges. This means creating institutional systems that recognize and reward scholarship in community colleges. For example, Shamai and Kfir (2002) contend that colleges that have a leading research culture take a pluralistic view of research. Additionally, these colleges include research on their agenda and do so with the consideration that it is part of their long-range strategic plan. This status promotes investing in college infrastructure that recognizes, promotes and supports research.

Leadership

SoTL is regarded more seriously when it is aligned with institutional vision and values (Kenny et al.,2016; Marquis, 2015; Goodburn and Savory, 2009; Schroeder, 2007) or with established disciplinary priorities (Cousin et al., 2003; Dewar and Bennett, 2010; Huber and Morreale, 2002; Marquis, 2015). The literature on SoTL has been consistent in its claim that high level institutional commitment is necessary to grow and sustain SoTL. Scholars have argued that senior leadership can promote interdisciplinary and collaborative research and contribute to the

development of a community of champions who can provide ongoing support for SoTL throughout the institution (Evers et al., 2009; Kenny et al., 2016; Marquis and Ahmad, 2016; Verwoord and Poole, 2016). The literature is also very clear that imposing SoTL from above does not bode well for faculty as they are already faced with increased workload and little time. Instead, a non-coercive approach is required to foster and sustain SoTL culture in academic institutions (Williams et al. 2013, 52).

Promotion of SoTL throughout higher education and within post-secondary institutions is uneven. Research has indicated that while academic leadership at some institutions is more committed to advancing SoTL, that same level of commitment may not be reflected at other institutional levels (i.e. departmental). This may be due to a number of factors which include the confusion or lack of understanding among faculty as to what constitutes SoTL, the lack of supportive attitudes towards SoTL in departments/programs, competing institutional priorities and initiatives, and the inability of academic leadership to translate their commitment into organizational culture, policies and practices (Wuetherick and Yu, 2016).

Promotion of SoTL in community colleges requires envisioning a research culture where none may have previously existed. Given that teaching has primarily been the focus of community colleges, promoting inclusion of research into community college culture would require senior leadership to include it as part of the vision of the institution. This would require colleges to have a long-term strategic plan that includes financial, human and organizational resources aimed at the development of research including SoTL research (Shamai and Kfir, 2002). This may be a challenge for those community colleges that are faced with day-to-day short-term struggles of existence. At the same time, development of a research culture can be viewed as a long-term investment in the development and survival of these colleges. (Shamai and Kfir, 2002).

For SoTL to become part of the institutional culture there must be effective communication and dissemination of SoTL activity across all levels of the organization, well established social networks and links between these levels, and sustained support by senior administration (Williams et al., 2013). Verwood and Poole (2016) draw on Williams et al.'s (2013) model of institutional change, which uses a weaving metaphor to explain how multiple and sometimes disparate threads, which represent organizational levels, are woven together to comprise institutional cultures. Using Williams' et al. (2013) model, Verwood and Poole (2016) look at the work of Roxa and Martensson (2009, 2012) on teacher conversations and its effects of teacher training in local contexts. Roxa and Martensson (2009, 2013) approached organizational relationships through a multi-level perspective that saw the micro level as individual workers, the meso level as networks and work groups and the macro level as management. Roxa and Martensson (ibid) found that instructors often formed small significant networks (trusted and private) with other individuals to discuss teaching and that these

networks influence instructor practice. Additionally, they found that when academic cultures are supportive of SoTL these instructor networks are more active.

Drawing on Williams et al. (2013) multi-level institutional change model and expanding on the work of Roxa and Martensson (2009, 2012) research, Verwood and Poole (2016) explored the role of emergent and appointed leaders. They argued that emergent leaders were crucial to institutional change and as such, it was important for institutions to nurture these leaders. Emergent leaders were largely rank-and-file instructors who operated almost exclusively at the micro level. Their leadership is more organic than appointed leaders who are a product of macro level decision-making. Verwood and Poole (2016) found that emergent leaders were those instructors who formed small networks to champion teaching innovation. They argued that conversations within these small networks are more effective if they are informed by scholarship and contribute to scholarship. It therefore follows that appointed leaders who are charged with championing and supporting teaching and learning within a unit/department and or institution would do well to connect with emergent leaders. For this to happen, it means that appointed leaders should not only know their institutional landscape but also be able to shape it. This requires that they pay particular attention to emergent leaders at the micro level and work to connect them and their networks to other networks either informally or formally. This would include getting networks together for events like conferences, seminars and skills development workshops on teaching and learning and SoTL. Verwood and Poole (ibid) refer to this as "micro nurturing". These small significant networks are necessary for weaving SoTL into the institutional culture. Therefore, the more support emergent leaders receive from appointed leaders (i.e. at teaching centers and/or SoTL institutes in organizations), the more likely there is to be institutional change.

The role of social networks in fostering cultural change to support SoTL promotes a more inclusive model of leadership than the traditional top-down one. This is important to a SoTL culture because as Verwood and Poole (2016) contend, "the impetus for change often resides 'backstage' with instructor's small but significant networks."

Building on the work of Mighty (2013) and her own research on SoTL at the University of Waterloo, Marquis (2015) indicates that effective SoTL institutes work to bring together and support a diverse range of scholars. In turn this, creates a community of practice that enhances the work conducted and can help individuals advocate for it within institutional cultures that may be behind in its support of teaching and learning inquiry. Therefore, besides building SoTL into the institution's strategic plan, and promoting values and norms that recognize SoTL, senior management would do well to invest in the development of social networks for disseminating SoTL practice and in rewards for SoTL excellence (Strickland et al., 2011; Williams et al., 2013).

Developing and sustaining these communities of practice is challenging due to the demands of time and lack of reward and career recognition associated with SoTL and the skepticism and distrust that has emerged around the linking of SoTL with the neoliberal managerialist agendas. However, as pointed out by many researchers examining SoTL, the work of appointed leaders is only as good as the support they

receive from the macro level (senior management). It is therefore worth repeating that high-level institutional commitment is necessary to grow and sustain SoTL.

Quality Assurance and Academic Control and Freedom

SoTL operates in a current context of fiscal responsibility and accountability, and calls for quality and performance. The shift to mass education has seen an increase in the number and diversity of post-secondary students worldwide. Amidst the current environment of reduced public expenditure on higher education and erosion of public trust in higher education there are greater calls for increased public accountability of higher education. This has resulted in increased pressure for institutions of higher learning to "drive up quality" and improve outcomes for this increasingly diverse student population (Hutchings et al., 2013). According Marx et al. (2016), "On the teaching front, the advent of highly publicized media rankings and tighter job markets for graduating students have created greater institutional emphasis on classroom performance. Moreover, modern technology has created pressure for faculty members to be adept in different modalities and to be able to serve different students in diverse contexts. Today's constituents (e.g. current and potential students, parents, recruiters) put extraordinary demands on college instructors, and the saliency of individual teaching performance, as well as institutional assurance of learning, is higher than ever before" (490).

As the pressure for accountability increases in higher education, teaching innovation is increasingly positioned as a necessary requirement; one that is being more and more linked to job security and advancement. Increasingly, SoTL is being considered an imperative rather than a choice (Mathison 2015; Huber and Hutchings, 2005). There is a degree of skepticism regarding institutional motives when it comes to the promotion of SoTL, particularly as it becomes couched in the language of performance, accountability and quality assurance (Mathison, 2015).

The work of Mathison (2013) on SoTL in an Australian university found growing skepticism, mistrust and resistance among academics as SoTL became a key performance indicator for them. Mathison's (ibid) findings underscore the complexity of the SoTL movement in higher education. As post-secondary institutions adopt a more neoliberal busnocratic approach to education that aligns research and teaching with a more performance-oriented and profit-making ends (i.e. competition for students and funding), there is skepticism in the SoTL community about the authenticity of SoTL and specifically, about how their research could be appropriated to push one-size fits all practices under the banner of quality assurance and administrative control.

A related concern is that of institutional silencing which links to concerns about academic freedom (Hutchings et al., 2013; Vithal, 2016). Hutchings et al. (2013) point out that faculty undertaking SoTL research knowingly take risks when they explore what

their students are and are not learning and then make that information public. They take these risks because the aim of SoTL is to better understand and improve their students learning. However, if findings run counter to what the institution seeks to promote, this can raise concerns around whose stories will prevail and the consequences for faculty whose research findings do not tell the stories that institutions want to hear. Hutchings et al. (ibid) contends if SoTL is to continue to grow in the current environment of austerity and accountability, faculty curiosity, passion and care for their students must continue to be the impetus for SoTL.

Some SoTL scholars have pointed out that concerns around quality assurance and that of faculty control over SoTL research and academic freedom do not have to be at odds with each other. Hutchings et al. (2013) argue SoTL can contribute to the central goal of accountability: ensuring and improving the quality of student learning. Similarly, the accountability movement can provide a space for integrating and valuing SoTL as a force for positive change in higher education (Hutchings et al., 2013)

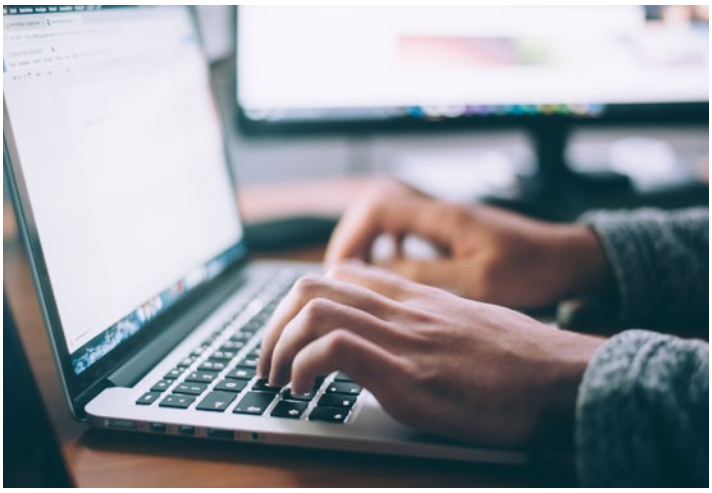
Quality assurance is top down coming mainly from outside the academy and driven by questions of efficiencies and resources. SoTL is largely bottom-up, driven by faculty questions and intellectual curiosity. Some educators worry that SoTL will be put at risk by the forces of accountability deforming it and undercutting the scholarly curiosity behind it (Hutchings et al., 2013). Hutchings et al. (2013) contend that the involvement of Teaching and Learning centers have been important in shifting the top-down imposition of quality standards to an opportunity for discussion and engagement regarding shared goals. Teaching and learning centers have played a central role in cultivating SoTL and as such SoTL scholars have emerged as mediators and translators between faculty and administrators, accreditors and policy makers. All of these bodies share a common interest: improving students learning outcomes. More often than not, these groups operate in their own circles with little interaction between them making it hard to promote discussion around a shared goal of student learning. This is exacerbated by the differences in discourses about student learning. Worst still these different parties often view one another as adversaries. Hutchings et al. (2013) argues that SoTL scholars play a critical role in bridging this divide "because of their intentional and systemic approach to analyzing, documenting and sharing student learning outcomes" (p. 41). Specifically, SoTL scholars "can serve as mediators or translators of external accountability mandates, by helping university administrators and faculty members develop a richer and more complex understanding of student learning that not only promotes continuous improvement, but also makes visible to external stakeholders the learning achieved by the institution's students" (ibid: p. 41) This bottom-up approach can also include students whose active involvement in SoTL can lend itself to ensuring that their voices are part of the discourse on accountability.

> **"Hence rather than letting differences between various educational stakeholders divide each other these parties can work together. SoTL rooted in the classroom and driven by faculty can help connect high-level accountability processes back to practice where they can make a difference in the lives and learning of students" (Hutchings et al.: p. 44).**

Lack of SoTL Knowledge, Skills, and Supports

SoTL attracts members from a variety of disciplinary fields and as such, SoTL can be considered to be multidisciplinary, with different disciplines adding to the richness of the research. However, it can also be a barrier to conducting SoTL research when researchers are unfamiliar with the discourse, literature and

methodologies in the field of education or teaching and learning research (Ruutomann and Saar, 2017). For example, research on SoTL in post-secondary institutions have found that faculty often lack confidence with higher education literature and research methodologies that are not part of their disciplinary background (Timmermans and Ellis, 2016). At the University of Waterloo, it was found that while faculty had ideas for projects, they were often at a loss when it came to clearly defining the types of learning they are seeking to enhance and elaborating a valid means of assessing whether this learning had been achieved (Timmermans and Ellis, 2016). A pivotal piece of advice for facilitating change and development was to start from where people are at in terms of their understanding of SoTL research (ibid, 2016).



Those who are unfamiliar with social science methodologies experience significant challenges when undertaking SoTL in complex institutional/curricula/classroom environments (Hubball et al., 2010; Karabenick and Collins-Eaglin, 1995). For example, many SoTL practitioners are unfamiliar with ethical obligations of research with human participants. This is particularly the case when practitioners come from academic disciplines where training in human research ethics is not the norm, or work with human participants is not a required part of their disciplinary training (Burnman and Kleinsasser, 2004; Maclean and Poole, 2010). The fact that most SoTL practitioners occupy a dual role of educator and researcher adds even more complexity to basic ethical principles of research (Pecorino and Kincaid, 2007; Hailey et al., 2013).

Miller-Young and Yeo (2015) suggest that SoTL members would benefit from understanding the range of perspectives and methodologies used in educational research. They argue that this awareness of philosophical and theoretical approaches about learning will help them "ask new questions, design better studies, and also more strongly articulate their findings, especially to colleagues with different world views" (40). As faculty become more familiar with the literature on teaching and learning, they will increasingly perceive connections between their teaching and the theoretical and empirical post-secondary literature (Karabenick and Collins-Eaglin, 1995). Arguably, improving communication and understanding across disciplines when it comes to theoretically grounded SoTL studies will also help to achieve broader impact across studies, and pave the way for new contributions to the field of teaching and learning (Miller-Young and Yeo, 2015).

Without support, SoTL researchers encounter isolation which can lead to disillusionment with SoTL. Thus, it is necessary for institutions to cultivate a critical mass of faculty (among other employees) who can not only champion SoTL but can network across the organization to allow for the exchange of knowledge, cross-fertilization of ideas and the development of a supportive SoTL Community of Practice (Mighty, 2013; Marquis, 2015; Mathany et al., 2017; McKinney, 2012; Williams et al., 2013). The University of British Columbia found that SoTL mentors with their SoTL community of practice helped to address key epistemological, methodological and ethical

challenges faced by individual faculty members when conducting SoTL research in diverse disciplinary contexts (Hubball et al., 2010). Subsequently, this Community of Practice which included SoTL mentors helped to offset many of the challenges SoTL researchers encountered and positively influenced SoTL research outcomes.

There is consistent recognition of the importance of Teaching and Learning Centers, and specifically educational developers in the design, delivery and advocacy of SoTL programs (Evers et al., 2010; Mathany et al., 2017; Ruutomann and Saar, 2017). Educational developers have been described as "the glue" when it comes to building and fostering an institutional culture of SoTL. Educational developers in institutions of higher learning are in a position to break down existing silos between departments, faculty and staff. According to Mathany et al. (2017), "educational developers have an opportunity to create inclusive programs, policies, and networks that support the increase of professional staff voices within SoTL discourse. By virtue of their (often) central position, educational developers play an important role in building SoTL campus networks that goes beyond any individual department or rank" (p. 13). Findings from a major HECQO funded study on faculty professional development activities indicated that 59% of respondents felt that Teaching and Learning Centers should offer support for research on teaching (Evers et al., 2010).

The research on SoTL has highlighted the key role that educational developers can play in supporting these scholars, by assisting with the development of SoTL questions, methods, ethics and other aspects of the research process (Mathany et al. 2017; Vithal, 2016). It is clear from the literature on institutionalizing SoTL that formal development opportunities are a key factor in the transition of faculty from a practitioner to a researcher. As Mathany et al. (2017) suggest it is important to have opportunities for faculty to become familiar with the literature and to participate in programs that support a guided and stepwise entry into SoTL in a way that balances with their own disciplinary development.

Today it is not just faculty who undertake SoTL research. In fact, employees in administrative and support roles in higher education are also choosing to pursue SoTL research. These employees face similar challenges when it comes to their lack of knowledge of SoTL discourse, literature, and methodology. Additionally, they encounter challenges to their professional identity. Whereas faculty have fought to have SoTL research recognized and rewarded in the same way as disciplinary research, administrative and support staff have fought to defend their right to conduct SoTL research. This is largely due to the fact that from the very beginning SoTL has been framed as the domain of faculty, given its focus on teaching and learning. However, administrative and support employees are very involved with students in their professional capacity, which has a significant impact on the students' success when it comes to learning. (Mathany et al., 2017) For non-faculty employees formal training programs in SoTL helps them to shed the imposter syndrome many of them feel when pursuing SoTL research.

Walker, Baepler and Cohen's (2008) research on encouraging SoTL among faculty at the University of Minnesota provides the following list of recommendations:

- Create a cohort of scholars around a shared problem to facilitate discussion and share resources
- Design a multiple year program to build commitment and to allow instructors to create interventions that can be assessed and revised over several semesters.
- Issue a formal faculty agreement that strengthens the social contract among participants and clarifies expectations
- Form diverse course teams to draw on a range of expertise and points of view and to divide the labor
- Foster cohesion and trust within course teams by ensuring that the teams remain together for the duration of the program
- Hold regular monthly meetings for all scholars in the cohort to share challenges and findings, draw on the work of experts, build camaraderie, and exchange work in progress
- Allow consultants with SoTL expertise to mediate faculty's early exposure to SoTL to help find and filter appropriate literature and highlight its relevance to the classroom issues in a particular course.
- Provide a variety of SoTL models from different kinds of sources and different types of scholarly explorations.
- Develop or provide a toolkit of evaluation methods to help instructors view the range of acceptable tools at their disposal
- Generate a list of conferences and publications so that instructors begin to understand their audience and the visibility of their own work.
- Offer help with writing, literature research, and poster design.
- Award stipends for SoTL conferences and professional development
- Partner with established units on campus to hold a local teaching conference where findings can be shared and possibly mainstreamed.

Taken from Walker, Baepler and Cohen (2008: p.188)

Supporting SoTL in Canadian Post-Secondary Institutions

Many institutions provide teaching and learning development grants, promoting what Clarke and Hollingsworth call "professional experimentation". These small grants enable faculty to enhance their knowledge and practice as related to teaching and learning. Given the challenges of engaging in SoTL, institutions have come to realize the need for supports beyond these small grants if they are to foster and sustain SoTL. What follows is a description of what some post-secondary institutions have done to foster and sustain SoTL at their institution.

Simon Fraser University has put in place a program that builds supports into the teaching and learning grants it offers faculty to undertake SoTL. These supports include 2 hour proposal development workshop sessions offered three times a semester. The first session helps applicants clarify questions/ purposes of their project. In the second session applicants receive feedback from one another as well as from workshop facilitators. After the second session there is one-on-one feedback between applicants and workshop facilitators until the proposal is finalized. If applicants complete all sessions and requirements associated with them, they are guaranteed funding. The program also supports faculty throughout their projects. This includes research skill development support (i.e. designing data gathering instruments, data analysis, etc) and besides the just-in-time support, there are also luncheon meetings that are organized two to three times a year which bring faculty working on project together to share their progress and challenges. Lastly, given that faculty are required to share findings, they are provided support with submitting final reports/posters (i.e. uploaded to grants website along with project description) and presenting findings at annual Teaching and Learning symposium (see Amundsen et al., 2016)

McMaster University's Institute for Innovation and Excellence in Teaching and Learning (MIIETL) was developed with the intention to enhance the universities contributions to pedagogical scholarship while still maintaining existing support for teaching provided by the Center for Leadership and Learning (CLL). MIIETL's included the creation of two new faculty positions (MIIETL Research Fellows) that combined their responsibilities to conducting SoTL work with MIIETL with their responsibilities to their academic departments. These positions were intended to respond to challenges such as the under-prioritizing of SoTL and lack of awareness or support for it in many academic departments. These positions have helped foster new connections between MIIETL and the departments in which the MIIETL research Fellows work, initiating SoTL projects based on departmental questions, integrating results of their research into teaching and learning in their programs. At the same time MIIETL was able to learn from departmental innovations, contributing to the development of collaborative initiatives with the potential to enhance student learning in their respective areas. Initially, these appointments were for a period of three years, with the intent to explore more long-term possibilities based on their success (see Marquis and Ahmad, 2016).

Mount Royal University established the Institute for SoTL. This Institute is separate from the Teaching Support Center, reflecting the institutional appreciation for the importance of SoTL. The Institute operates as a research center, encouraging and supporting SoTL inquiries, providing resources and coordinating initiatives and building a culture or inquiry about teaching and learning. The Institute sponsors a range of programs and initiatives including research dissemination grants, conferences and events, community outreach, writing residences and the Nexen Scholars program. Using small grants awarded by the Institute the Nexen Scholars program

supports an annual cohort of faculty researchers whose projects focus on student learning within their own class(es). These faculty researchers are supported by Institute staff and upon completion of the program have opportunities to apply for "going public" travel awards and to attend a five-day writing residency (see Miller-Young et al., 2016).

University of Waterloo supports SoTL through their Center for Teaching Excellence (CTE). The Center provides support for the continuum of scholarly work on teaching and learning from reflective practice to more traditional forms of SoTL. Faculty-based "teaching fellows" were launched by the Center to provide leadership and teaching within their unit in order to develop a set of best practices for teaching that would improve student learning in their unit. The CTE offer grants to investigate student's learning and alternative approaches to teaching and assessing learning at individual, departmental, faculty or institutional levels. The staff at the CTE support faculty members' adoption of scholarly approach to investigating teaching and learning. They provide faculty with guidance on how to draw on and apply pedagogical literature and show evidence of reflection on teaching and learning (see Timmermans and Ellis, 2016).

Centennial College

Scholarship of Teaching and Learning (SoTL) is a more recent addition to Centennial College's strategic plan. However research on teaching and learning has been a part of the College for longer than its formal integration into the College's Strategic plan.

Centennial College's Teaching and Learning in Higher Education (TLHE) Program was restructured in 2010. Part of this restructuring included a focus on teaching and learning research, specifically action research. The TLHE program is aimed at preparing teachers for 21st century teaching, highlighting aspects like active and experiential learning, learner-centeredness, technology, global citizenship and research. The program requires those enrolled in it to complete four mandatory courses and three electives. One of these mandatory courses is an action research practicum. This is the Program's capstone course and can only be taken once all other mandatory courses are completed. The action research practicum is structured around preparing those in the program to carry out an action research project that focuses on their teaching practice.

This one semester course has learners acquire basic research skills, develop a research proposal from which they undertake their research, collect and analyze data, and present their findings in either the form of a report or a presentation they share with their colleagues. This course is completed with the support of an instructor who is skilled in research and in the field of education. Additionally, the class size is usually small (with the odd exception) with only one section of the course offered per semester and with somewhere between 7-20 people per class. This enables greater individual support from the instructor and more opportunity for learners to support one another through the research journey.

Over the last decade there has been over one hundred action research projects completed, which has contributed to strengthening not only the pedagogical confidence of teachers (and prospective teachers), but also their confidence in undertaking teaching and learning research. Most importantly, these research projects have translated into greater success for Centennial students who not only benefit from the pedagogical transformation of their teachers, but also benefit from shaping the learning process for themselves and future students by virtue of being active participants or more aptly co-researchers in these projects.

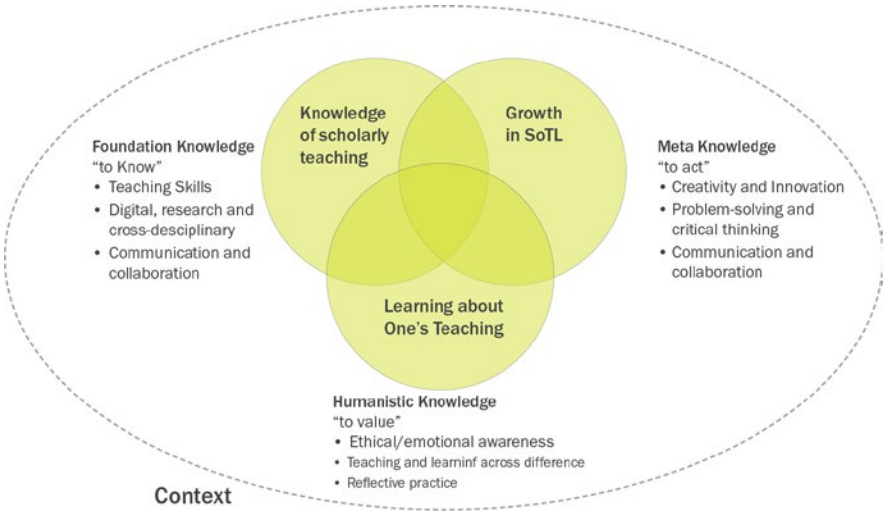
Centennial College's formal Scholarship of Teaching and Learning initiative began a little over half a decade ago. Under the leadership of Dr. Marilyn Herie, who at the time was the Dean of Learning, Teaching and Scholarship at the Centre for Organizational Learning and Teaching (COLT), the College embarked on a strategic course that would encourage faculty to approach their teaching through a SoTL lens.

Dr. Herie recognized that many of the College's faculty had innovative and creative approaches to teaching that were important to share with the Centennial College community as well as with the wider higher education community. She also recognized that the best way to do this was from the perspective of SoTL.

Scholarship of Teaching and Learning (SoTL) that drew on the work of Boyer (1990) and Randall et al. (2013). This framework outlines three overlapping and dynamic elements of teaching and learning scholarship:

1. **knowledge of scholarly teaching,**
2. **learning about one's teaching, and**
3. **growth in SoTL**

This framework incorporates broader kinds of 21st Century teacher knowledge, including foundation knowledge (such as teaching skills and digital, research and cross-disciplinary literacies, as well as internationalization in education); humanistic



https://www.centennialcollege.ca/centres-institutes/teaching-excellence-and-academic-quality/scholarship-of-teaching-and-learning/

Unlike university, research is not a required part of faculty work and so the challenge became how to convince faculty to undertake SoTL research when this was the case. Dr. Herie understood that research required time, knowledge and resources and set about to address these obstacles and with it shift the institutional culture of the College.

In Spring 2015, Dr. Herie, alongside the Centre for Organizational Learning and Teaching (COLT) developed an institutional framework for the

knowledge (which includes ethical/emotional awareness, values and issues of diversity and difference in the classroom), and meta knowledge (such as creativity and innovation, problem solving and critical reflection, and communication and collaboration across disciplines). This integrated adaptation captures the richness and complexity of SoTL in a global context, reflecting Centennial College's emphasis on global citizenship, equity, inclusion, and valuing of multiple ways of knowing, being and learning.

Alongside the unveiling of this SoTL framework, COLT introduced the Scholarship of Teaching and Learning Research Fund that would fund faculty research projects that would inform innovative and evidence-based teaching practices that enhanced student engagement, learning and success. Each approved project would receive a budget of up to $1,500.00 to cover project-related expenses, of which at least 25% of the total approved budget would be applied towards a student research assistant. In addition to the expense budget, full-time faculty who were the initial target of this initiative would receive 6.51 complementary hours (established equivalency standard for a 3-hour course release) for the semester in which they undertook their research (Fall or Winter).

Later, the SoTL Research Fund was made available to Centennial College's Contract faculty. Approved projects by Contract faculty would receive the project-related expense budget, and payment for three hours a week for one semester at the non-teaching rate.

Recognizing the role that support and administrative staff play in the success of students at Centennial College, the SoTL Research Fund was expanded to include them. Like full-time and contract faculty, approved support and administrative staff projects are eligible for the expense budget. However, their research time was to be recognized and accommodated by their home department.

Besides the funding, COLT provides support in the form of workshops for those wishing to engage in teaching and learning research/scholarship to get them started and to provide proposal support for those completing their application forms. As SoTL has become more embedded in the institutional culture of the College, COLT has worked to provide workshops and other resources aimed at building the research knowledge and skills necessary for those wishing to pursue SoTL at the College. There is also a small but dedicated team at COLT that works with employees whose projects are approved. This support includes administrative and research support.

Since the introduction of the SoTL Research Fund in 2015, there have been over 40 projects that have been funded from a variety of Schools and departments at the College. Several of these projects have gone on to secure additional funding to continue the research projects they completed through the SoTL Research Fund. Most have gone on to publicly share their work at conferences (both at the College and externally) and some have even published their research in academic journals.

Recognizing the impact of SoTL research on student success, the senior leadership at Centennial College, particularly Vice President, Academic and Chief Learning Officer Dr. Marilyn Herie continues to champion SoTL by ensuring it is part of the institution's long-term strategic plan.

Centennial College Teaching and Learning in Higher Education Action Research Practicum (TLHE 704) Course Projects

When planning this issue of the digest, a key objective was to share the teaching and learning research undertaken at Centennial College. A call went out to all graduates of the TLHE704 -Action Research Practicum course, requesting their willingness to share their research projects in this issue of the Teaching and Learning Innovation Digest. There was an overwhelmingly positive response to this request. What follows are brief descriptions of twenty-seven action research projects that were undertaken by practicing and prospective educators as part of the TLHE704 Action Research Practicum course.

How can the use of video instructions improve student's comprehension of online assessments?

In online courses, Nicole Bailey, an instructor in the School of Hospitality, Tourism and Culinary Arts, found that many students would come to her with the same questions time after time. Repeatedly rewriting the instructions for course work had no impact on this, leading Bailey to suspect that the written format itself may be fundamentally unsuited to explaining course materials and assessments. Considering that perhaps video instructions may be superior, Bailey created her research question, and undertook her research with a particularly well-suited class of students.

The class was one Bailey had taught in the previous semester as a fully online class. This semester, she'd be teaching that same group in a blended class format, allowing Bailey to quickly notice any change in their behaviour or performance that video instructions may cause. The students were also mostly international, evenly divided between male and female, and Centennial was not a first-time post-secondary experience for any of them.

Bailey began by giving the students an assignment in the form of a comprehension assessment, followed by written instructions and then an instructional video. The second assignment reversed these steps, beginning with the instructional video, then written instructions, and then the comprehension assessment. Finally, Bailey issued an eCentennial survey on the students' feelings and preferences in regards to online learning. The marks from the two assignments were compared with each other and to averages in two previous semesters.

There were several important findings from Bailey's research, including that student participation was higher and more in-depth with the online assessment tool. The research also showed that video instructions led to more correct answers on the assignments, fewer questions about instructions, and slightly higher grades than those of the previous two semesters that didn't offer video instructions. Appropriately, students also reported that they preferred and appreciated having video instructions.

Although Bailey wishes more students could have participated and provided feedback in her research or articulated how they think video instructions help them, the means by which she should improve her teaching are clear. Audio-video instructions are now included for all of Bailey's assessments, and she has even begun work on short podcasts for important class updates.

How can a team charter improve the effectiveness of group work?

Professor Michelle Belchetz teaches in the Business School's Marketing Management Graduate Certificate Program. The majority of her students are international students who have already some form of postsecondary degree/diploma and some have work experience. Despite this experience Belchetz found that most of them have limited or no experience working on group projects, which presented a challenge for Belchetz who teaches the Marketing Project Management course. According to Belchetz, "every semester she has at least one or more students from a group complaining that not all group members are doing their fair share, aren't showing up for meetings or are not responding to group communications." She says that "sometimes tensions get very high between group members resulting in small arguments, tears and a lot of stress".

Belchetz, wanted to find ways to help these students work better together and set them up for success ahead of the group project in order to alleviate some of the tensions and stress. Given that many of them

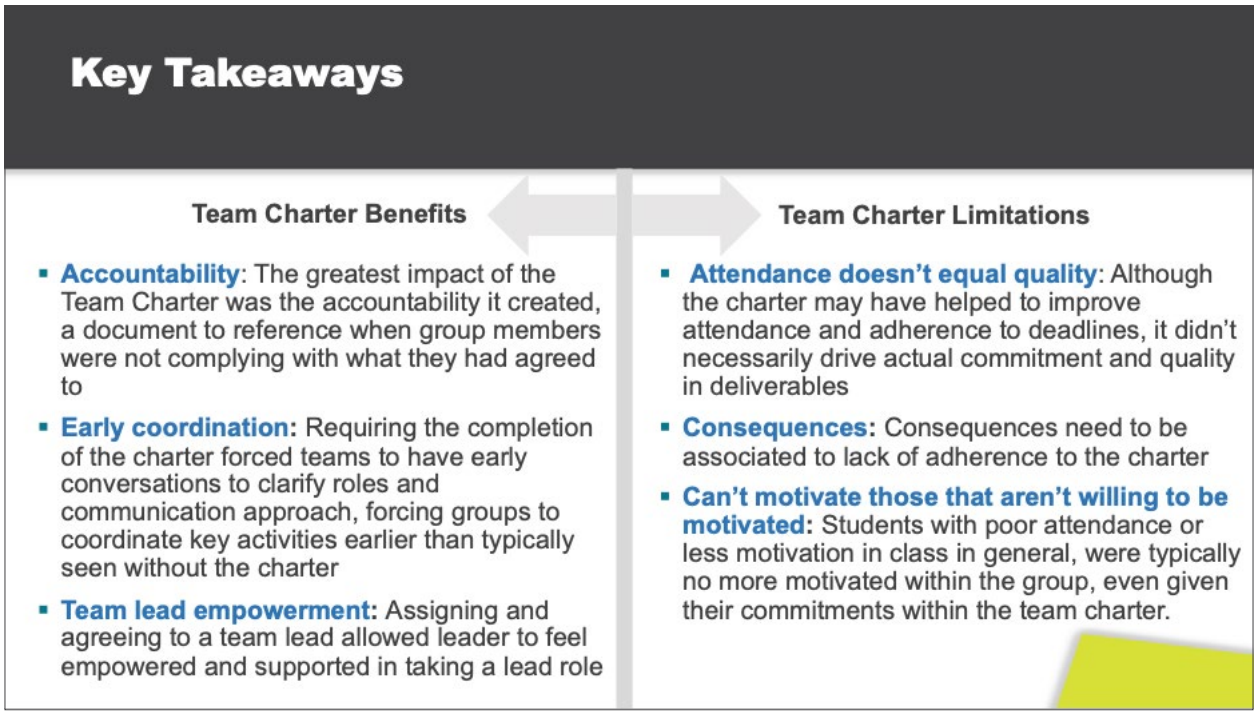
have never worked in groups before, she felt they needed support to navigate this new way of working. Hence, Belchetz decided to explore how the use of a team charter could improve these students effectiveness of group work.

Using students from her Marketing Project Management course for her research subjects, Belchetz asked them to form groups and then as a group work through a Team Charter template she created. This template would ask them to agree on roles and responsibilities, communication approaches and expectations, prior to starting their group project.

Belchetz's gathered her data from a pre-survey students completed about what behaviours they believed important for effective group work and on observational field notes of how well students worked in their groups during class, particularly how closely they kept to their commitments in their team charter and lastly a post survey that gauged students perceptions of the influence of the team charter on behaviours of the team members.

After careful analysis of her data, Beltchetz found that 85% of respondents believed that the team charter was useful in improving the effectiveness of the team. Particularly, her students believed the charter had the greatest impact on establishing clear roles and responsibilities and influencing team members to abide by deadlines. Helping set a structure and ground rules was a primary way students saw the charter assisting with the effectiveness of their teams. However, a small portion of students felt the team charter did not contribute to effectiveness of the team. Belchetz felt that associating consequences with non-compliance could likely elevate the importance of the team charter, resulting in it being taken more seriously.

The following chart taken from her final research report lists the key takeaways from her research



Belchetz believes that team work is a learned skill and professors can help students become better at it by providing the tools and support like team charters.

How can using game-based learning technology improve student engagement in the classroom?

Professor Hanika Bhojwani-Chen teaches a number of different courses with the Business School, one of which is economics. As Bhojwani-Chen herself argues, "economics can sometimes become quite serious and intense." Wanting her students to see economics as "fun" and be more active learners she decided to use Kahoot, an interactive game-based learning app to see if would increase her student's engagement in the classroom.

Using students from her economics course to conduct her research, Bhojwani-Chen collected data by way of observational field notes, analytics from the Kahoot app and a survey that asked students to rate their overall attitudes and experiences with game-based learning and specifically on their experience with the use of Kahoot in her class.

Based on the results from her survey Bhojwani-Chen found that not only did students enjoy the experience of Kahoot, which was also confirmed by her observational data, and her improved class attendance, but 93% felt that it had engaged them in the subject matter, while 84% of them felt it better helped them understand the subject material. Additionally, she found that 88% of the students said they would like to have more technology game-based learning in their program.

For Bhojwani-Chen her findings reinforced her belief that game-based learning technology improves student engagement in the classroom by encouraging competition, enhancing motivation, and promoting active learning. She continues to incorporate appropriate game-based learning technology at appropriate points of delivery of content throughout the semester in her economics course and has started to apply it to other courses she teaches.

How can summative assessements utilizing EdTech tools improve students' higher-order Bloom's taxonomy cognitive skills?

Professor Christine Chan teaches bridging (to university) students who have already graduated from the Practical Nursing program in the School of Community and Health Studies and are looking to become Registered Nurses. As Chan argues, despite already having acquired nursing knowledge and competencies from the Practical Nursing Program, it is important for these students to enhance their learning and higher-order cognitive skills such as critical thinking if they are to care for persons with acute and chronic illnesses.

Chan's own experience as a learner in the Teaching and Learning in Higher Education Program at Centennial College exposed her to various EdTech Tools and their pedagogical effectiveness in promoting and fostering higher-order cognitive skills like critical thinking. Therefore, it became fitting for Chan to want to explore whether or not these EdTech tools could be applied in her own classes to improve the higher-order cognitive skills of her students.

The participants in her research study were the 39 bridging students enrolled in her NUPD701 –Acute and Chronic Illness Theory course. Chan used four different EdTech tools for her research, aligning each with specific course content covered each week: a.) Padlet for case studies b.) Kahoot for individual quiz and c.) Quizlet and Socrative for group activities.

Students would use these tools to engage with the particular summative assessments associated with the content being covered in class. While students were engaging in summative assessment, Chan observed their interaction and behaviour; noting data in tally sheet. The outcome of improvement in student evaluation was compared using in-class chapter review marks (Weeks 5, 10 and 12) with 22.5 % weighting of the final course grade. These post-quizzes were blueprinted to include multiple-choice questions patterned to have comprehension, analysis, synthesis and evaluation. Students rated perception assessment questions in a self-made survey on a likert scale (1- strongly disagree; 5- strongly agree) based on EdTech tools utilized (Padlet, Kahoot, Quizlet and Socrative). After tallying survey forms, the outcome was compared to in-class chapter review marks and validated by observational data from tally sheet and a results from the Mentimeter poll (an online polling app)

Question 10 on the survey which summarizes students' perception about EdTech tools and their level of performance in the course found 33% of students strongly agree that utilizing EdTech tools improve their critical thinking; 38% agree and remaining 29% are neutral. Meanwhile, a poll using Mentimeter revealed that 75% of participants felt happy that EdTech tools were introduced in class. Furthermore, tally sheet of observational non-verbal cues provided more data to support results of survey.

Chan also found a successive increase in grade averages for in-class chapter review quizzes (Weeks 5, 10 and 12). Data showed that out of 39 submitted grades in Week 5 quiz; the average grade was C+. Successive quizzes had increased grade averages, for Week 10 the average was B and for the final quiz in week 12 the average was B+.

Chan believes that her research strongly supported her belief in the pedagogical value of EdTech tools to foster higher-order cognitive skills in learners and continues to use them in many of her classes in the courses she teaches.

How can the use of Kahoot increase student engagement in the Environmental Legislation and Regulations course?

Timothy Chen is a graduate of Centennial College's Biotech Program. Based on his own experience as a student in this program, he felt that is was important to look at ways to increase student engagement in the Biotech program. This links to his fundamental belief that what a professor says has little bearing if no one is listening. To that end, Chen decided to test the impact of Kahoot, a freely accessible internet learning game-based platform.

Chen approached Professor Carol Preston who was teaching the VS-242 Environmental Legislation and Regulations course. This course is extremely content heavy and the material is not easy to engage with, hence the reason Chen chose this class to conduct his research. With the permission of professor Preston, Chen attended classes and worked with her to integrate Kahoot sessions into some of the classes. Classes had approximately 50 second-year students, and while sitting in on Preston's classes, Chen took note of how often students shifted attention to their phones and otherwise failed to pay attention to Preston and course material.

Ironically, in his analysis (based on coded observational data), Chen found that as tedious as laws and regulations can be to a class with a science background, Carol Preston's excellent teaching and lecturing style was repeatedly cited by Chen as consistently holding the class's attention, and ensured a level of engagement too high for Chen to consider the norm. While the inclusion of Kahoot segments in-class did create a noticeable boost to student engagement, Chen could not verify how much of this was from the fun and engagement of student participation in a trivia game and how much was the influence of the already-effective instruction of Professor Carol Preston.

Based on his analysis Chen drew the conclusion that Kahoot.it had been successful in increasing student engagement, even if Carol Preston had obscured how great that impact had been. In his view, if even an excellent professor could have student engagement improved by Kahoot, then any professor could benefit from its inclusion in the class.

How can the coaching feedback method improve students' performance on assessments?

Ingrid Forrest believes in the importance of feedback for her students, in Advertising and Marketing Management Communications, Corporate Communications, Public Relations, and Interactive Media Management. While she spent a great deal of time and effort giving written feedback, Forrest could not help but wonder if students were actually bothering to read it. Researching the learning styles of millennial-aged students, she learned that they had a great need for feedback. Forrest had noticed this in her post-grad interactive media students, and so she elected to make them the subject of her action research question.

The students were enrolled in the Studio Mentorship course at the Story Arts campus, part of the Interactive Media Management post graduate certificate program. They were in the second of the three semesters of the program, and most of them came from a creative or design background. The class consisted of 18 students with ages ranging from 21 to 30, with approximately 60% being international students and a 60/40 split between women and men.

To conduct her research, Forrest dedicated a class in Week 10 to a session on how to read feedback, and distributed pre-surveys on students' ability to assess feedback. In Week 11, the class practiced mock interviews and were provided written feedback they could use in preparation for the actual mock interviews in Week 12. In Week 13, students read reflections on their interviews and received their grades.

Pre-survey, the students expressed an understanding of the importance of feedback, and that they have the opportunity to act on feedback prior to the final submission of an assignment. Consistent with the earlier findings, they also believed that providing feedback in a timely fashion is important.

Post-survey, students stated that they understood and appreciated Forrest's feedback, and the influence it had on their final grade. Most praised the quality of Forrest's feedback as well.

Forrest had found strong evidence of coaching feedback having a positive influence on student performance, and verified the critical importance of feedback in the performance of her students. She has resolved to continue providing detailed feedback to her students in all taught classes, secure in the knowledge that it is appreciated and useful.

How can lab illustrations improve students' performance in biomedical engineering labs?

Soheil Ghoreyshi, is a professor in the Biomedical Engineering Program where many of the courses he teaches are in the lab. Over his time teaching lab classes in his program Ghoreyshi noted that students consistently had trouble where it came to correctly setting up lab equipment, which negatively impacted student's performance in the lab. Observing this difficulty, he speculated that the problem came from the lack of pictures or diagrams in the lab manual. Encouraged by his colleagues who had similar experiences with their students, Ghoreyshi decided to examine how incorporating lab illustrations into lab manuals could improve students' performance in the lab.

Ghoreyshi randomly assigned his 36 second-year Biomedical Engineering Program students into two groups. Both groups would be operating in identical circumstances and conditions, with the exception that one group would be using a newly-created lab manual with illustrations and the other would use the usual text-only manual. Ghoreyshi had three sources of data: observational notes he made based on students as they set up and used the lab experiment, students grades on post-lab quizzes, and the quality of the students' technical lab reports.

Ghoreyshi found that the students with the illustrated manual were noticeably more comfortable throughout the experiment, and their post-lab quizzes and lab reports were graded 10% higher than the group with the traditional text-only manual.

Based on his findings, it was clear to Ghoreyshi that lab manuals with illustrations were not only more accessible, they were more easily and immediately comprehended no matter the student's level of fluency in English or their style of learning. Accordingly, Ghoreyshi resolved to be more conscious of accessibility in his teaching and class materials, and the Biomedical Department elected to make all of its lab manuals illustrated in light of this research.

How can reminder emails to students to complete online work improve student success?

Professor Bruce Haden-Leblanc's HTAP102 Introduction to Accounting is a hybrid course with a flipped class concept – Students are required to complete online tutorials and a quiz before class and come prepared to ask questions and practice in class what they learned online. Students then complete post class homework online after class in addition to online tutorials and quiz for the next week. It is a cycle that continues for the entire semester with tests every few weeks. Unfortunately, many students do not complete the tutorials and quiz before class and as work is left incomplete, students fall behind to the point where they are unable to succeed in the course and fail. Hayden-Leblanc hoped that checking student completion of online work and sending a reminder email a few days before would prompt those that had not completed it to do so. Ultimately, Haden-Leblanc hoped that by completing the online work it would contribute to higher rate of student success in this course.

The research participants were students enrolled in the Hospitality – Hotel Operations Management program at Centennial College. All students had completed at least one semester in the program. Class sizes varied from 48 – 50 students per section. Most students were International from diverse cultural backgrounds, as well as having different levels of education and expertise with computer learning. This was also their first post-secondary education experience and many students had (initially) expressed insecurity with online learning.

After checking completion of online work (checking text book publisher's online learning environment to check completion of online tutorials and quizzes) reminder emails were sent to out to students 2-3 days before the due date. Online completion rates were tracked to see if reminder emails influenced completion rates. Also, at the end of the semester an anonymous in-class survey was distributed to students to get their opinion on whether they found reminder emails inspired them (or not) to complete online work on time.

The final results indicated that email reminders failed to increase student completion of online work, and failed to impact a trend Haden-Leblanc had noted in his course of online work completion dropping over the course of the past four semesters. For Haden-Leblanc, all of these factors suggest to him that HTAP102 requires a shift of marking weight more to the in-class sections of the course than the online segments. He believes further incentives to complete online work could and should be explored, but that online resources are more helpful as something supplemental rather than central to student learning.

How can a video demonstration improve the efficiency of students' performance in the lab?

Professor Haleh Hosseini's classes in the Computer Networking program feature labs as a means of letting students gain practical experience in handling hardware. However, as in many classes, the students often arrive in labs without a clear understanding of how to carry them out – Hosseini would have to personally coach students through setup and procedure, which was especially inconvenient if students arrived late. To help make sure all students could inform themselves of lab procedures and not have to leave class without having finished all their tasks, Hosseini decided to create a short lab demonstration video and post it on YouTube so that students could watch before coming to class. The hope was that students would view the video before class and be better prepared to complete the lab procedure in class, hopefully improving the efficiency of students' performance in the lab.

Hosseini chose to test her demonstration video with the classes of her Fundamentals of Computer Networks course. Approximately 50 students were enrolled across four sections, drawn from the Computer Systems Technician, Software Engineering Technology, and Game Programming programs. The majority were males from 18-25 years old, with three fourths of the course being international students. The lab of the course's Week 9 would include the new video demonstrations, and student behaviour and effectiveness would be compared to the conventional lab of Week 8.

Based on analytics of how many students watched the video, observational notes on students' behaviours during labs, and pre/post student surveys, Hosseini found strong evidence to indicate that the video demonstrations helped with students' performance of the lab. Specifically, Hosseini also noted that the number of students who finished the Week 9 lab was

greater than that of Week 8, and they also progressed quicker during Week 9 lab. With less time starting the lab, students had more time for higher-level interactions with Hosseini in class, and it gave them more time to compile and analyze their lab findings.

From Hosseini's research, video demonstrations provide an inexpensive and efficient means of informing students of lab equipment and setup. The use of these videos in other classes, courses, and programs are something she would recommend for more educational and more productive labs.

How does the use of coloured paper on tests affect students' perception of their test performance?

Shelley Ince has typically printed the tests for her courses in the Community and Justice Services Program, on a variety of coloured papers. While this was done to prevent students sitting close together from cheating, Ince was fascinated by student reactions based on the colour of the test paper they received – there were obvious expressions of satisfaction and dissatisfaction by students depending on the colour of the test paper they received, with some going so far as to openly request a specific colour. While the tests printed on all these coloured papers were identical, Ince was motivated to test whether the student's perception of test paper colours (and its effects on student behaviour) influenced their perception of their performance on tests.

Ince conducted her research on two sections of the CJSP-212 Profiles Course. Each section had 55 to 60 students. All tests throughout the semester were printed on blue, pink, and white paper. While efforts were made to randomize the distribution of tests to each student over the course of several tests, inconsistent class attendance made alternating the distribution patterns of tests difficult. Aside from the colour of the paper and the order of the questions everything was identical.

In addition to student marks on the tests, Ince also took observational notes of student behaviour and reactions while writing tests. Ince, also requested students to complete a voluntary Likert-style questionnaire that asked them to rate to their perception of their performance on their tests and their level of satisfaction with the colour of their test papers and the relationship between two.

Ince found that for questions as to whether the colour of their test sheet impacted their mark or their ability to remember course material, a majority of students felt that there was no impact in both cases, nor did they say they would prefer a different colour test paper than the one they received. Ince did find that students with pink test papers received a 10% higher grade than those with white test papers, but there was no evidence to indicate that this was nothing more than a spurious finding. Based on Ince's findings there was no correlation between test paper colour and students' test scores. That being said there was still a perception on the part of some students that when they wrote their test on paper colours they preferred they felt it helped them to better concentrate.

While colour theory may not have an impact on student test scores, Ince's research has shown that there is still the perception by a small number of students that the colour of their test paper makes a difference to their ability to concentrate. Ince continues to use coloured test papers but more for their utility in reducing cheating.

How can Adobe Connect improve student attendance?

Professor Anastasios Kastaris teaches in the Electronics and Biomedical Engineering Programs where attendance can be an issue in some of his classes. While keeping students engaged and attentive towards course material is one of the central goals of any teacher, this effort begins with getting

students to actually show up to class. Rather than try to find incentives for students to show up to class, Kastaris resolved to see if he could bring the class to the students by way of Adobe Connect (AC), an online learning platform to determine whether or not it would improve "attendance".

Kastaris carried out his research on a class of 40 Electronics students in their third semester. Given the limited time for his research Katsaris was only able to deliver one class online using Adobe Connect. Using tally sheets, field notes, and pre and post surveys Katsaris found some interesting but largely positive results. Generally, the students gave high scores to the AC platform for ease of use, participation, performance and functionality. Katsaris believed these performance-related results are precursors to student satisfaction and indicate that students value and feel comfortable with the AC platform. The students also registered high levels of satisfaction and enjoyment with the AC lecture and the prospect of learning asynchronously by watching the recorded lecture. To Katsaris this indicates that students can feel engaged and motivated to attend AC lectures synchronously or asynchronously, which can lead to not only improved attendance, but might also contribute to improved student performance.

At the same time, given that his data is only reflective of one session with Adobe Connect Katsaris is reluctant of generalizing these results. However, the positive results, of the one AC session, indicate that students are highly responsive to the functionality and features of the platform. To Katsaris this indicates that with increased use of AC, students will not only become more familiar and comfortable with the AC platform, but more responsive to learning this way, particularly for those that encounter barriers to attending face-to-face classes.

For Katsaris it is important to use innovative electronic delivery methods to enhance his teaching delivery and to reach students whose lives are changing in ways that make it difficult for them to learn in a face-to-face environment.

How can a music break (listening to 15 minutes of happy classical instrumental music) improve student performance in architectural design lab?

Professor Yu Li teaches ARCH-201 (Design and Computer Aided Drafting Project 3) a four hour Architecture Design course. Regardless of the subject matter it is easy to see how challenging it can be for students to be in-class for four hours at a time. Aware of the elaborate research and scientific study into the importance of the learning environment on the learning process, Lu wanted to find a way to lessen the stress and anxiety that students experience from her lengthy four hour class, which she felt negatively impacted their class performance. Lu was also aware of the massive body of research pertaining to the effects of music on mood and performance. In scouring the research literature on this topic she found that while learning and working are enhanced by music, not all types of music elicit this finding. After careful research on the topic, Lu decided to examine how including a fifteen minute break where uplifting classical music was played could improve her students' performance in the lab.

Lu began her study with two sections of her ARCH-201 course. Over the course of four weeks, students received a fifteen-minute break set to the tune of Mozart's K448 Sonata for Two Pianos in D Major. Lu collected observational field notes and had her students' complete pre and post surveys. She also compared the students marks to those of students in a previous semester of this course which she had taught.

Lu found that the mean average of marks for both sections of her course this semester began lower than the section from the previous semester she taught

this course, but she also noted that the rate of improvement over the semester for both sections of her course was double that of the previous semester rate of growth. Lu also found the amount of students that were actively contributing to their own success through the weeks of the study was also gradually increasing.

While Lu only had four weeks for his study, she felt confident based on her data that offering the "Mozart break" through a whole semester would yield even greater academic results for students. The students themselves expressed appreciation of the music break, and some suggested alternative genres and songs. For Lu, it is clear that her classes should always include time set aside for Mozart, or a song that engenders the same feelings and academic efforts by its listeners.

How can Mentimeter exit tickets increase student comprehension of course concepts?

Teaching in the Business School, Alex Maletich was inspired to take a new approach to the challenge of raising student engagement. Reasoning that shy students may be abstaining from classroom discussion for fear of speaking up in front of the class, Maletich resolved to determine if an anonymous and online means of giving feedback and questioning lesson materials could make a difference for student comprehension.

Maletich decided on his Introduction to Microeconomics class for the study. Consisting of roughly 30 students of an international and domestic mix, the class had Mentimeter exit tickets made available at the end of class. Anonymous and only viewable to Maletich, any subjects brought up in the exit tickets would be taken up at the beginning of next week's class. As Mentimeter's exit tickets are accessed via any electronic device (such as the students' phones), the class was comfortable taking part in the study.

Throughout Maletich's research, he took notes on the students' comprehension of subjects, submitted Likert-scale questionnaires asking the students to rate how much they enjoyed and valued the exit tickets, and also tracked students' success on assessments. By nearly all of these metrics, the exit tickets were a resounding success; test scores increased, students demonstrated increased comprehension of course topics, and they also expressed approval of the use of digital exit tickets in the classroom. However, a segment of the students also stated that they would prefer pen-and-paper exit tickets to those answered online with Mentimeter.

What Maletich took away from his research was that students were happy to voice their issues and concerns with course materials when given an autonomous means of doing so. The results have convinced him to integrate exit tickets into more of his courses, and to be more conscious of whether students are keeping up with and understanding content as he explains it.

How can using eCentennial intelligent agents facilitate student engagement?

Justin Molloy was curious if he could increase student engagement through use of eCentennial's intelligent agents, the analytics systems built into eCentennial that allow teachers to see how long students observe and interact with what teachers post. The intelligent agents also allow for teachers to have pop-up notifications for students when logging in to eCentennial for upcoming events in courses, be they assessments or specific lectures requiring certain readings to have been done. Molloy decided that these pop-up notifications could be useful reminders for students to complete necessary readings and assignments so that they would come to class better prepared and thus more apt to engage in class discussions/activities and assessments.

Molloy conducted his research with the 17 students enrolled in his GNED500 course (Global Citizenship and Equity) who were largely from the Massage Therapy program. For three weeks, Molloy made extensive use of eCentennial's intelligence agents by implementing notifications throughout GNED500's eCentennial page and closely monitoring what impact that made on students' engagement on eCentennial and in class.

Molloy's research data was not only gathered through eCentennial digital footprint records, but he also kept track of student engagement in the classroom using an observational checklist that tracked the number of students that engaged in the class in various ways, from raising hands to ask questions to emailing him after class for further clarification on subjects. Molloy also had student regularly complete a self-report engagement survey.

Based on his analysis of the data, Molloy determined that students were either unaffected by the use of intelligent agents, or experienced a slight improvement. He also found that in class, those students that interacted more with the intelligent notifications were more engaged.

For Molloy, the most important discoveries of his research were the possibilities that the intelligent agents of eCentennial offered. While their impact on student engagement was only slight, they still presented an effective means of interacting with students in larger classes and providing utilities for online learning. Molloy is intent on exploring the other educator features of eCentennial, and documenting their impact on his teaching.

How does using E-Centennial for testing increase student satisfaction?

Professor Chris Muir teaches in the School of Transportation Motive Power Program. Over his time of teaching at Centennial Muir has shifted away from in-class pen and paper testing to in-class online testing. Students are required to bring their own mobile device to class to write tests and those that do not have a device, are provided a school issued mobile device. In an effort to gauge his student's satisfaction with this mode of test delivery Muir decided to collect data on his students experience with this method of testing.

Muir collected data from 4 sections of his first semester student classes and 2 sections of third semester student classes with each section having approximately twenty-two students. Students filled out anonymous surveys (which were voluntary) after completing their midterm test in-class, which consisted on 50 questions delivered in an online format. Additionally, class averages were compared to other instructor sections of the same courses but where their students were writing their in-class test in a pen and paper format.

Muir found that his class averages were comparative to that of other sections with different instructors whose student wrote their tests using pen and paper. Based on the 34 of the 88 students who completed the voluntary survey the majority of students enjoyed the online format of testing citing reasons like instant feedback and immediately knowing your grade upon completion of the test. Muir also found that students who wrote on school issued mobile devices were less satisfied than those who brought their own devices to write on.

For Muir the findings from his research confirmed what he had informally sensed in his shift to online testing and reassured him that the direction he is taking with moving more of his courses tests to this online format is the right decision.

How can using formative peer evaluation improve students' ability to work in self-selected teams?

Fifty percent of the grade Centennial College's only compulsory General elective course GNED500 (Global Citizenship) is derived from teamwork. For Professor Roger Nault who teaches sections of this course, teamwork is the most difficult and least supported part of the course. Combined with the stress that comes from such a large amount of the course's marks coming from interactions with fellow students rather than the teacher, there was dissatisfaction among students about how marks were assigned. For Nault, offering an element of Peer Evaluation seemed an appropriate response to what was effectively a call from students for more justice in assessment.

Approaching the matter with the intention to incentivize the improvement of teamwork skills, Nault implemented the use of an interim, formative peer evaluation aimed at providing students with an opportunity to create conversations and connections with each other so as to foster a more constructive team environment moving forward.

The students in Global Citizenship were drawn from a variety of different study programs. Nault's study would be focused on the four sections of the course he personally taught.

Nault would apply his research question to the course's 3-Stage Social Analysis Group Project. In self-selected groups, students would complete the Proposal, Report, and Presentation of that project throughout the semester. Concurrently, they would complete a two-phase peer evaluation scheme.

A two-phased peer evaluation scheme was introduced. The first phase was an in-class, paper-based, formative round of peer evaluation, conducted in week 5, following the submission of the Social Analysis Proposal. Learners were then invited to voluntarily and anonymously reflect on their experience working in their Social Analysis Proposal team in an open-ended manner. Finally, teams then gathered to hold team improvement discussions wherein objective conversations were created by focussing on feedback relative to the criteria and scores on the peer evaluation forms. These conversations provided the space for team members to surface and resolve issues and offered an opportunity to learn from the past, re-connect and re-commit to the team moving forward.

The second phase of peer evaluation, conducted in week 10, was summative in nature. In week 10, following submission of the Social Analysis Report, the summative round of peer evaluation was conducted. Each student was given the opportunity to evaluate themselves and their team members on the same six criteria using the same 0 - 4 scoring system. In addition, a dichotomous question, yes / no, was added to capture each learner's overall impression of the two-phased peer evaluation system: "Do you feel that the formative peer evaluation and team improvement meeting following submission of the Social Analysis Proposal (in week 5) influenced how members of the team worked together since?" Unlike the initial week 5, formative round of peer evaluation forms, the week 10 summative peer evaluation forms were by their nature not anonymous and were submitted to the Professor for the joint purpose of course administration and research purposes. Learners were then, as with the week 5 round of peer evaluation learners, invited to voluntarily reflect ("share your [their] experience working on your Social Analysis Proposal team") in an anonymous open-ended manner.

This second, week 10 round of data was collected in two ways. The first was paper-based, completed in class by students that were present on the day, and the second, for absent students was conducted on-line using the survey function on eCentennial. Approximately 15% of respondents utilized the on-line option.

With a wealth of data from both phases of his research, Nault's study had been fruitful. Not only was the week 5 round of formative peer evaluation and team improvement meeting explicitly influential in how team members worked together, the data suggests that in total and in most cases it provided a lift to both self and others' peer evaluation scores. This conclusion is confirmed and described by data from the open-ended, qualitative reflection data.

For Roger Nault, the findings validated the use of the tested peer evaluation scheme which is important enough to justify itself, but more broadly these findings open the door to further considering the Professor's role as a supplier of opportunities / systems / tools that students can employ to manage their own acquisition of teamwork and other possible skills.

How can student involvement in rubric creation improve their performance on assessments?

Rubrics are a valued resource to students for outlining specifically how they can achieve a good mark on an assessment, and are similarly valued by teachers for explaining assignments to students and creating a sense of fairness if a student is marked poorly. Even so, Professor Kim Nguyen had noted studies on rubrics and how their existence alone doesn't improve student performance depending on the subject or the nature of the assessment. Further, Nguyen also theorized that including students in the process of creating their rubric could greatly engage them in the associated assessment, and the subject matter it pertains to. Subsequently, this promoted Nguyen to explore the question of how student involvement in rubric creation could improve their performance on assessments.

Nguyen conducted her research with two sections of the Corporate Social Responsibility and International Development course she teaches in the Business School's International Business Management program. Students for the research were almost entirely international students, all in their third or fourth semester and between 18 to 25 years of age. Approximately 20% already had degrees or had worked before, and the rest had arrived straight from high school.

Nguyen introduced her action research question to her class in Week 9 of the Fall 2018 Corporate Social Responsibility course and went over the rubric for assignment one. In Week 10, she went over the rubric for assignment 2. During the introduction of each assignment Nguyen organized the classes into groups, which provided feedback and modifications for the rubrics through questionnaires. Students were also surveyed in class on their thoughts regarding their participation in rubric development, and Nguyen herself kept field notes and tallies of student behaviour.

By Weeks 12 and 13, Nguyen had marked the assignments and determined the answer to her action research question. Comparing the average mark on assignment one between Summer 2018 and those of Fall 2018, the students who had participated in establishing the assignment's rubric had managed an average 4% higher (78.5% to 74.5%). For assignment two, the increase had been a 12.3% increase (72.3% to 60%), but Nguyen also attributed this to the Fall 2018 base rubric for the assignment being clearer than the Summer iteration. Combined, the average for the two Fall 2018 assignments was 78.5% to the Summer's 72.3%.

The students expressed that they felt empowered, engaged and motivated by their participation in creating the rubrics for their assignments. For Nguyen, her research findings emphasized the importance of rubrics being co-created. She has resolved to always given students the chance to provide input on rubrics before posting them, and to ensure that the whole class fully understands them.

How can watching video demonstrations prior to class increases students' understanding of a new topic?

In Professor Aderson Oliveira's past experiences with teaching Web Application Development (COMP229) in a traditional lecture-based approach he has observed that the majority of students feel overwhelmed with the amount to content that is covered. During lectures students end up not retaining much, feeling rushed through the content with insufficient time neither to practice nor to follow what the instructor is trying to convey.

Olivera says that as an instructor you feel demotivated and frustrated as you realize you will spend 2 hours talking through the content and most of it students fail to grasp and subsequently will not retain. He sees this as a waste of time and potential.

It was these kinds of experiences that caused Oliveria to shift his teaching to a flipped classroom approach where his students would come to class having seen, read or watched some information about the topic. Then during class he would conduct a small lecture for the more advanced concepts, but between concepts he would get students to practice via quizzes, code project exercises, group activities, mini-presentations and video demonstrations.

Since shifting to a flipped classroom approach Oliveria noticed a difference but was particularly curious about whether or not the video demonstrations he created

for his students to watch beforehand were actually working to increase their understanding of the topics they covered in class. Thus, this became the focus of his research

His research participants were students enrolled in five sections of the COMP229 - Web Application Development course. This course is taken by students in Software Engineering Technician, Health Informatics Technology and Game Programming programs offered by the department of Information and Communication Engineering Technology with the School of Engineering Technology and Applied Sciences. The participants' vary in age, from new high school graduates to mature students. A high percentage of students in the program are international students from diverse backgrounds, and the number of male students (about 60%) is typically higher than female (about 40%). The total number of students in the five-section combined is 153.

For his research Oliveria had his students watch three coding demonstration videos (which he uploaded to YouTube) and then practice what they learned. He also required they submit 3 questions about the videos and complete the online quiz, which would assess their grasp of the concepts conveyed in the video. Lastly, they needed to complete the checklist on eCentennial, which would result in students securing a 1% bonus mark towards their final grade.

Oliveria tracked how many students watched the videos and how much on average did they watch of each video. He also looked at how many students submitted their three questions and assessed the relevance of the questions to the topics covered in the videos. Additionally, he tracked how many students completed the quiz and their performance on it. Lastly, Oliveria had them complete a voluntary survey to gauge their opinions on the use of the demonstration videos to aid in their understanding of the topic.

From his data Oliveria came to the conclusion that

there is no definitive link between the videos and students' understanding of the content. However over 90% of students did report that this approach is helpful and better than their experiences in other classes. The results were encouraging to Oliveria who intends to continue pursuing and refining it.

How can the gosoapbox.com application be used to increase participation during in-class writing exercises for business communication students?

Professor Jeff Parsons teaches Business Communications courses in the Business School. Parsons has found that the best way to help his students who are largely English as a Second Language (ESL) learners to improve their written communications is through frequent in-class and unmarked writing exercises, which the students could then get feedback on.

These writing exercises were traditionally done on paper, but Parsons found that participation was neither consistent nor guaranteed in his classes. Compounding this was that having 30 to 40 students in a class meant giving timely feedback to them was a challenge. Given the 19-25 age range of his students and their extensive use of mobile devices in class, he decided to introduce the online discussion board gosoapbox.com to the class. Parsons wanted to study how the gosoapbox.com application be used to increase participation during in-class writing exercises for his business communication students.

Testing the impact of gosoapbox.com on two sections of the same Business Communications course in one semester, Parsons had students practice their writing exercises in class on paper and electronically through gosoapbox.com. After students completed the exercise, some of the gosoapbox.com submissions would be taken up with the entire class; the aim was to have students suggest corrections for improving these written communications. Besides increasing student participation, Parsons also felt that this would address the challenge of giving students timely feedback. Additionally, the use of gosoapbox.com would also provide a record of submissions that could be accessed by students whenever, which some took advantage of.

To assess whether or not the use of gosoapbox.com increased his students' participation during in-class writing exercise, Parsons took note of the number students of who were present and participating and the amount of time they spent to make submissions along with their quality. He also noted the quantity and quality of student participation when correcting the online submissions.

Additional research took the form of questionnaires issued to students to determine their attitudes towards electronic and paper exercises.

By the end of the semester, Parsons had surmised the following findings: First, he did not find a noticeable difference between the number of students who submitted their exercises on paper or electronically. Secondly, the survey failed to yield conclusive findings with regards to student preference for paper or electronic submissions. In fact, survey findings contradicted Parsons observations of students' choice to use paper or gosoapbox.com. The survey findings also did not adequately capture the high student participation Parsons observed when taking up gosoapbox.com submissions in class.

Parsons observed that the entire class was engaged and interested in giving feedback on gosoapbox.com submissions, which was not fully reflected in the survey results.

Parsons's findings did not provide a definitive answer to his research question. Despite the confounding results, Parsons felt that based on his observations there was value to using gosoapbox.com. In critically reflecting on the findings, he felt that methodological weaknesses in his research could be the reasons for the inconclusive results and that a future iteration of this research would have to take this into account.

Parsons still believes that using the gosoapbox.com website provides benefits to student participation in class, though he concedes his findings do not conclusively support this. He has expanded his use of electronic tools in the classroom with Nearpod, and remains a believer in technology's ability to improve student engagement, interaction, participation and feedback.

How can the use of a variety of technologies in the classroom increase student engagement?

In the AUTO-234 Drivelines 2 course that Professor Kathryn Pratt teaches in the School of Transportation, two sections of this course had largely positioned themselves on opposite ends of class engagement. 'Section A' students were enthusiastic, participated in classroom discussions, and were consistently keen to learn more. 'Section B' students, however, were prone to asking if various classroom activities were actually for marks. Pratt wondered if integrating a host of technologies into her course could make the 'B' students more like the 'A' ones in terms of their engagement level.

The opposing dispositions of the students in two different sections of the same course were convenient for research purposes. Pratt included the following online tools in both classes:

- Kahoot, for test reviews.
- Socrative, for lesson reviews.
- Educaplay, for end-of-unit recaps.
- Argo, for automotive tutorial lessons.
- Todaysmeet, for class discussion.

Pratt gathered data from both sections, each having 45 students. Data took the form of surveys conducted before and after classes, ascertaining student engagement levels before and after interacting with the various tools.

Findings indicated for 'Section A,' which was already showing consistently high engagement with the course, Kahoot and Socrative had proven popular for the competitive energy they brought to the class. Simultaneously, some students expressed a preference for still having 'traditional' classes on occasion with pen-and-paper activities and group discussion.

For 'Section B,' whose lack of engagement in class had prompted Pratt's study, a slight increase in engagement was noted. However, students that were actually present during these class activities were highly engaged and expressed enjoyment of all the online tools used.

Pratt's research suggested that technologies had not made the decisive difference; engaged students were already engaged and non-engaged students hadn't been swayed by the changes in the class. Pratt ascribes this finding more to the decision not to have integrated these well-received technologies earlier in the semester, where attendance was higher in 'Section B' and the interest of its students could be reliably captured. For Pratt, the path forward for more engaged classes has been to move appropriate content online, include the better-received online tools in her future classes, and retain standard classroom teaching methods (such as chart papers) that have remained popular.

How can the use of Kahoot technology increase levels of student engagement in the class?

Professor Sivaguru Sahajananthan teaches in the Business School's Project Management Program. Sahajananthan enjoys teaching to the diverse array of international students who make up the majority of his classes. That being said Sahajananthan noticed that many of them were exhibiting poor classroom engagement. Having heard of Kahoot.it, a game-based learning application and its potential for increasing student engagement with learning in the classroom, Sahajananthan decided to focus his research on how the use of Kahoot technology could increase levels of student engagement in his classes.

The particular course Sahajananthan chose for his research was PMGT701: Fundamentals of Project Management. The students in it were international students, and extremely diverse in age, educational background, manner of employment, and, appropriately, levels of engagement. While a handful of these students were genuinely engaged with the course, the majority were somewhat or fully disengaged.

Sahajananthan integrated Kahoot as a regular part of PMGT701 classes. Participation in Kahoot quizzes was made mandatory, with an optional and anonymous survey on students' feelings on Kahoot also provided prior to and three classes after introducing it. Research was also gathered from focus group discussions on the value and impact of Kahoot on the class. In addition to the marks students had on the Kahoot quizzes, Sahajanathan also took notes on his observation of student behaviour and engagement in the classroom.

All methods Sahajanathan had employed pointed to a clear and positive answer to his research question. The survey, employing Likert-scale questions, featured numerous answers of “Somewhat Engaged” that vanished entirely by the time of the second survey, which were improved to an 85% rate of “Very Engaged” levels. Many other such survey questions corresponded to Sahajanathan’s observational notes, such as a greater confidence in asking questions on course materials, increased participation and enthusiasm in class, greater acceptance of educational technology in the class, and the fundamentally positive impact of students using their personal devices for a classroom-related purpose.

Sahajanathan meticulously kept records and gathered data on Kahoot’s impact on class engagement, but his own personal views on Kahoot’s merits were decided long before his research concluded. Students were far more engaged in the course, and a number of obstreperous behaviours in class were either channeled positively, in the case of side conversations between students, or vanished outright, in the case of students misusing personal technology or even napping in class.

For Sahajanathan, Kahoot’s success is hard proof of the value of gamification for learning. Kahoot has been integrated into all of his classes, and he has begun designing his lessons and classes with Kahoot content in mind.

How can using an unstructured lab sheet improve student performance?

Professor Terry Sambolec’s GM ASEP Program in the School of Transportation has students alternate between 1 month at Centennial learning theory and technique and 1 month spent as apprentices in car dealerships. Naturally, Sambolec’s teaching on automotive maintenance features many instances of performing exercises in the repair of cars with “bugs” deliberately set for the students to resolve.

These exercises were accompanied by corresponding lab sheets, but Sambolec suspected that the lab sheets were too linear – and by virtue of that, many of the car exercises were as well. By providing a list of actions to undertake and things to check, it was possible that the lab sheets were making the lab exercises procedural. Not only did this discourage non-linear thinking and creativity, but an exercise in “just following instructions” obviously didn’t encourage students to retain their learning. Sambolec resolved to try solving this with an unstructured lab sheet, leaving students free to explain how they approached and resolved various “bugs” in their labs.

Having decided to conduct research on how unstructured lab sheets could improve student performance, Sambolec set out to answer it. With ample pre-existing data of student performance with the traditional lab sheets, the study focused primarily on how students handled the car exercises with the

new unstructured lab sheets. The classes Sambolec taught were used for the study, with 18 to 25 students in each who are typically in their early 20s and registered automotive apprentices working in a GM dealership (a prerequisite for the program). All the students had pre-existing automotive knowledge, but their practical knowledge depended on their supervisors' discretion at their various apprenticeships.

Making notes with observation sheets during the students' exercises, assessing the new unstructured lab sheets after completion, and using previous structured lab sheets for comparison, Sambolec assembled three sources of data to determine the results of his study. The results were as he predicted; in an environment that encouraged non-linear thinking and providing greater autonomy, students were much more engaged in car exercises and diagnosed and solved problems in the ways they themselves felt most comfortable with. Grades improved marginally, but learning and problem-solving skills for the classes had increased greatly. Significantly, students themselves expressed that they felt more confident about taking on harder jobs in their apprenticeships.

Sambolec, in light of his research, has actually retained structured lab sheets. However, he now uses them exclusively for newer classes and students to help them learn the basics, and then switched to unstructured lab sheets as soon as possible. Having himself been a student of this program 20 years ago, Sambolec was pleased to change the ASEP Program in a way that better reflected the actual work environment.

How can reducing work load improve student perception of their mental health without decreasing their performance?

At least once every year, Professor Glenville Singh had experienced a student become totally overwhelmed by their workload, along with usual stress and difficulty in keeping up with assignments that students express in class. While the obvious solution was to assign less work, Singh was aware that this couldn't come at the cost of impairing the students' education. Arriving at his research question, he resolved to strike a balance between mental health and student performance in his classes he taught in the School of Transportation's Truck and Coach Program.

Singh's students were primarily from the GTA, and were highly diverse in ethnic, cultural, religious backgrounds, and ranged in age from 18 to 40. Carefully reducing the class's workload, Singh observed his class over two weeks, and provided them a 20-question survey to gain a sense of their level of stress in the program and overall mental health. Comparing and contrasting this to his knowledge accrued from ten years of teaching in the program, Singh could reliably track any changes in behaviour, demeanour, or grades.

The research pointed to several conclusions, the most obvious of which being that students appreciated the lighter workload. Looking more at ease in-class and with an absence of school-related meltdowns, the students were swift to correlate this with having less homework. Singh also found that less work hadn't impacted student performance on assessments; most students displayed healthy progress in their learning, and those that sought extra help weren't more or less numerous than they normally were.

The main lesson Singh has taken from his research is that when designing his assignments he should focus on quality, not quantity. While he now includes fewer individual assessments in his classes, he makes sure that each one is more engaging, and challenges his students to conduct their own research and display a greater familiarity with and understanding of course materials.

How can a pre-knowledge assessment improve student performance?

Professor Mauro Spies believes that when students prepare for a class beforehand there is a greater probability that it will translate into better results for them. Spies, who teaches in the Business School, decided to research how a pre-knowledge assessment would improve the performance of his students in his COMP-126 Applied Business Software 2 course.

For the four sections of COMP-126 that Spies selected for his research, the combined 88 students averaged 20 years of age, and came from a variety of academic backgrounds. Very few had any pre-existing experience with the software COMP-126 is centered on, and Spies would take the same approach to all four sections.

The purpose of testing students' pre-class knowledge was to encourage class preparedness. Spies' used of short eCentennial quizzes on subjects to be covered in the next class, ranging from four to six questions depending on the upcoming class. As there were two classes a week and four weeks remaining in the course, students had the opportunity to complete eight of these optional quizzes. To encourage the students to participate in this research and undertake the quizzes, Spies would award a bonus mark to anyone who completed at least four quizzes, which could make a crucial difference in a students' final grade. The structure of the course and its presence mostly in computer labs meant only tests could be observed for the purposes of Spies' research, and so the marks on those became the main metric for determining how quiz completion influenced student performance.

Despite the possibility of a bonus mark and 85% of the total students completing at least one quiz, only 45% of the combined course sections made the effort to complete five quizzes. These students enjoyed an average of 14.5 more marks on the course's third test, as opposed to the 10.8 average additional marks that students who completed one to four quizzes received. Despite lackluster participation, Spies still had the data to illustrate a correlation between pre-knowledge assessments and student performance.

Spies has since adopted quizzing at the beginning and end of all his classes, as well as encouraging students to study from their textbooks in between classes. He is certain that this greatly helps with students' knowledge retention and engagement, and has applied this teaching technique to many subjects beyond what he covered in his research study.

How is students' performance on assessments affected by a change to three-option Multiple Choice (MC) format from the current four-option MC format?

Professor Justin Taheri's research question did not emerge from experiences in the classroom so much as developing trends in educational thought. While most multiple-choice questions have four options, Taheri had learned of the merits of lowering that number to three, and its positive impact on student scores on assessments. Despite this, the industry standard of education is for multiple-choice questions to have at least four possible answers. To determine if the benefits of three-option questions merited trying to overturn that industry standard, Taheri began his research.

To ensure data gathered would clearly show the difference between three and four-option questions on multiple choice questions, Taheri compared two classes of one of his Finance courses from the Business School: the Spring 2016 class versus the Summer 2016 class. Each class was approximately 40 graduate students, chosen carefully for a similar balance of international and domestic students. Taheri's research was focused squarely on looking the difference between the assessment scores of the two classes to see if the class with assessments with three-option multiple choice questions would perform better than his previous class which had assessments with four-option multiple choice questions.

The theory of the three-option question's superiority is basic math; even if a student has to guess the answer, 33% chance of being correct is greater than a 25% chance. In practice, Taheri's research failed to assign a clear advantage or disadvantage to the class with the three-option questions; Taheri attributed this to an undersized sample.

Lacking research results that might demand reform in post-secondary testing, Taheri has held true to four-option multiple choice questions. Given that students will still be facing an industry standard of those questions in their exams in the rest of their academic careers, he sees no need for his classes to be outliers.

How can hands-on lab practice increase students' comprehension of theoretical knowledge?

Professor Vinay Vaithilingam had noticed a discrepancy while teaching the concepts and principles of programming. In class, students stated that they fully understood the subject matter, but this stated confidence in the classroom was not translating into high test marks. Afterwards, students meeting with Vaithilingam would express difficulty remembering all of the necessary theories and concepts needed to do well on the test. Believing that the problem stemmed from too much theory and too little practice in his teaching, Vaithilingam resolved to study how hands-on lab practice could increase his students' comprehension of theoretical knowledge.

Vaithilingam undertook his teaching experiment with two fifth-semester sections of the Software Engineering Diploma program, which had a total of 56 students. The students were offered more hands-on lab practice and were given surveys pre and post the midterm which asked questions relating to how often and how long they participated in lab-practice and how much it aided their understanding of theory, their programming skills and their application of theory to practice. The last question in the survey asked students to rate their overall experience learning in the computer lab classroom.

From his research, Vaithilingam derived two findings. Firstly, the importance of assessment to learning cannot be understated, and assessments are instrumental to guiding students towards desired learning outcomes. Assessments in the form of lab exercises give students practical experience, increased self-confidence, and motivation.

Secondly, Vaithilingam determined the importance of feedback. While the importance and use of feedback for students is self-evident, opportunities to get it to students in the classroom are few. Assessments create more instances of feedback from teachers, while also making the thinking process of students apparent to the educators who can then plan their lessons accordingly.

Vaithilingam's results indicated that practical experience in work labs did indeed improve understanding of theory in his class, and the opportunity to put theory into practice was of especial benefit to kinesthetic learners. In giving students more opportunities to speak and do rather than strictly listen, it helps them to make the connections between theory and practice.

Centennial College Scholarship of Teaching and Learning (SoTL) Research Fund Projects

A requirement of all SoTL research is to make it public, where it can be shared, critiqued and built upon by others. What follows are examples of a handful of the almost 40 SoTL research fund projects that have been undertaken by faculty and staff at Centennial College. The following contributions were authored by the researcher and edited by Dr. Zabedia Nazim.

Students Experience Using a Vital Signs e-Texbook

Margaret Verkuyl NP PHC MN is from the Ryerson, Centennial, George Brown Collaborative Nursing Degree Program in the School of Community and Health Studies. She has been teaching at Centennial College since 2005. It is important to note that the SoTL project was conducted by a collaborative team of faculty at Centennial College and Ryerson University.

The purpose of Verkuyl and team's research project was to explore students' experiences using a newly developed Open Educational Resource (OER) used in health study courses. More specifically, Verkuyl and her team conducted a qualitative research study using focus group in an effort to understanding of how massage therapy, Occupational Therapist Assistant/ Physiotherapist Assistant (OTA/PTA) and, practical nursing students interacted with the OER and to understand its perceived utility and pedagogical imprint. The researchers' interest in this topic stems from having developed an etextbook OER that provides an inter-professional, interactive and technology-enabled resource for students in healthcare programs and learners to review vital signs skills. Verkuyl and her team were curious to know how students interacted with it. The etextbook OER was created through adapting two existing OER and adding additional content. The vital signs topic was chosen because it is a foundational skill for all healthcare providers.

The chapters of the OER followed a learner-centered pedagogy in the format of 1) theoretical rationale for a vital sign; 2) application; 3) appropriate technique; and 4) interactive activities, including find the error, try it out, and test yourself. Navigation was provided through an expandable content side bar. The platform was interactive with images, video clips and activities. The vital signs etextbook OER can be found at http://pressbooks.library.ryerson.ca/vitalsign/

The research was conducted at Centennial College in the massage therapy, OTA/PTA, practical nursing programs. The study sample included 29 students who participated in three discipline specific focus group consisting of MT (n=9) semester 1, OTA/PTA (n=8) semester 1 and PN (n=12) semester 2. Most of the participants were women (n=25) between the age of 18-25 (n=19) and a few participants over the age of 35 (n=4). The majority of the participants had previous experience using etextbooks (n=25) and approximately half had completed another degree (n=14). The analysis yielded six themes: (a) This Generation's Learner; (b) Ways of Knowing; (c) Accessibility; (d) Convenience; (e) Design; and (f) Visual and Other Types of Learning Styles.

Participants were positive about using the etextbook OER to learn vital sign skills. Technology provides us with learning resources that can be highly interactive, adaptive to different learning styles, and accommodate individualized learning needs. Participants provided the researchers with an understanding of how specific features in the etextbook OER and specific technology-enabled media met their learning needs. In addition, they provided he researchers with design considerations for future etextbooks. The results increased the research team's understanding of using etextbooks in higher education.

The research supported the use of etextbook OERs in our healthcare program. The results provided an impetus to continue using the etextbook OER and to create more. This study has been shared at conferences and has been published in Open Learning: The Journal of Open, Distance and eLearning.

Applying Online Delivery to Culinary Arts Theory – ICAM 105

Professor Samuel Glass teaches at Centennial College's School of Hospitality, Tourism and Culinary Arts (SHTCA). In 2018 Glass secured a SoTL research fund grant that was used to study the introduction of an online approach to teaching culinary curriculum, specifically, food theory level 1 (ICAM 105). This course is a first semester course taught to both culinary and hospitality students.

A major impetus for this research was to address the low test scores of the current cohort of students, most of who can be categorized as the screen or 'new media age' generation (Cinque and Brown, 2015). Glass questioned whether the traditional face-to-face teaching methods had run its course and was ineffective where it came to meeting the needs of this current generation of learners.

After conducting a search for online culinary theory providers, it was determined that one provider, KP Compass offered an online theory course that would meet the curriculum requirements and outcomes for the fish and seafood module as identified in the course syllabus for ICAM 105. Over the period of several weeks, Glass and the Chair of the culinary department worked with a representative of KP Compass to review the content and customize as needed.

Students were notified ahead of time that the regularly scheduled face-to-face class would be offered online and that they would receive instructions via e-mail and e-Centennial (the learning management system) on

how to access the online module. After the students completed the online module and were tested on the content, they were asked to complete a voluntary anonymous online survey through the e-Centennial portal. The survey consisted of 13 closed questions and one open ended question, which solicited written comments. Combined, the questions offered both qualitative and quantitative data for this research project. Fifty-five of the 110 students in the three sections of ICAM 105 that participated in this study completed the survey.

The data yielded some interesting results. Approximately 22% of the respondents preferred online to in-class, while slightly less than half of the respondents (47%) preferred in-class to online and close to a quarter of the respondents (24%) said they would favour a hybrid approach, which would combine in-class and online learning.

Approximately 36% of the respondents indicated a preference for more face-to-face classes (keeping the status quo), with an equal amount preferring a hybrid (a mix of on-line and face to face) approach. A little less than a quarter of respondents (24%) wanted more online classes.

Almost one-third of respondents (32.8%) indicated their test score was higher than previous tests, while a little less than one-third (30.9%) indicated that their test result was lower than previous ones. The remainder of respondents indicated that test results were the same as previous tests.

The open-ended questions, which was essentially an opportunity for students to comment on their experience as it pertained to the research topic and yielded a rich array of opinions on how students felt about their experience in this research study and their overall experiences where it came to learning

Effect of first language on intelligibility

Professor Sadat-Tehrani holds a Ph.D. in linguistics from the University of Manitoba, and his research interests include phonology, phonetics, intonation studies, second language pronunciation, and first language interference. His articles have been published in many peer-reviewed journals, including TESOL Journal and Journal of the International Phonetic Association. He has a long experience in teaching ESL, TESL, linguistics, and supervising TESL trainees. He is a faculty at Centennial College where he teaches for the English Language Learning and English for Academic Purposes Departments.

In 2017, Sadat-Tehrani secured a SoTL research fund grant from Centennial College to study the research question: Do English learners understand each other better in English when they share the same first language?

This study consisted of two parts. The first part is the report of two experiments carried out to see the effect of a shared first language (L1) on second language (L2) intelligibility. The concern of the investigation was specifically pronunciation and phonological factors. The second part deals with pronunciation errors of Mandarin and Vietnamese speakers that are motivated by their respective phonological systems, thus providing help with designing pronunciation teaching materials.

To measure the intelligibility of speech, talkers and listeners of different L1s were used. Two experiments were carried out. The first concerned English and Mandarin and the second Vietnamese and Korean. The research was approved after undergoing ethical review. The audio recordings of English sentences produced by different talkers were played for different listeners, who were asked to transcribe what they heard. Based on the number of correct keywords written, the intelligibility score was calculated.

The results indicate that L1 does influence intelligibility, i.e., talkers who share the same L1 understand each other better. The details of the experiments and the findings can be found in Dr. Sadat-Tehrani's journal article THE EFFECT OF FIRST LANGUAGE ON INTELLIGIBILITY published in TESL Ontario -| CONTACT Magazine.

Enhancing Learner Engagement through Co-Determined Learning: Supporting Autonomy and Capability Across-the-Curriculum

Professor Philip Loosemore received a SoTL research fund grant to explore a question that he had been thinking about for some time- Does incorporating capability training into instructional design increase students' self-confidence as learners and improve their ability to self-regulate their own learning?

According to Loosemore, "Current learning and future job success depend not only on a student's ability to acquire particular course outcomes, but also on their ability to learn in general. As important as course content is, students arguably also need to possess, and to carry forward, the ability to learn new things, to adapt, to stay current, and to retrain themselves. My question emerged out of concern for this dimension of students' growth, and out of some reading I was doing in the fields of self-determined learning and self-regulated learning."

Based on his previous reading on self-determined learning Loosemore singled out the concept of "capability" as being particularly important. Drawing on the literature, Loosemore highlighted Hase and Kenyon's work which argued that capability "means the ability to use acquired competencies "in novel situations rather than just the familiar" and refers to "a justified level of self-efficacy for dealing with novel problems, having appropriate values, being able to work in teams, and knowing how to learn" (Hase and Kenyon, 2001, p. 113).

Based on this concept of capability Loosemoore wanted to find out how strategic and self-confident in their learning his students already were. He wanted to see if their thought processes might show him where they could use more support in terms of self-confidence and self-regulated learning. He also wanted to know whether teaching through the lens of "capability" produced observable changes in students' awareness of their learning process and in their perceptions of their own capability as learners

In the 2017 winter semester Loosemore carried out his research with students from one section of his COMM 170: College Communications 2 course. Participants were asked to complete three brief online questionnaires. These questionnaires were the same, but they would be issued at three different points in the semester. Participants used a unique code as an identifier to protect their identity while allowing their responses to be tracked over the three questionnaires. While all students were required to complete the questionnaires consent was required for those whose questionnaires were used for the purpose of the research study.

The questions on the questionnaire were designed to yield insight into students' capability, where a *capable learner* is defined by the following characteristics:

1. Sets appropriate, specific goals on their own before undertaking a learning task.

2. Devises a plan of action on their own to see the task through.
3. Monitors and reflects on their own progress through the task.
4. Identifies their own strengths and gaps in knowledge or skills.
5. Reports high levels of confidence in their own ability to work on those same knowledge/ skills gaps and to apply their learning to future, contingent situations.

Loosemore aimed to see if there was progression (based on responses from the questionnaires issued at intervals throughout the semester- weeks 4, 8, 12) where it came to these characteristics of a capable learner.

Throughout the semester Loosemore promoted a "capability mindset" through his teacher talk and activities including the online questionnaire itself. According to Loosemore, "I helped students learn how to set practical, measurable, relevant goals and devise a plan for tackling a project. I encouraged them to think about setbacks and challenges as opportunities for growth, and I reinforced this attitude through my rubric and instructional discourse, which were focused not on deficits (mistakes and problems) but rather action steps (what could students do to improve?).... In short, I looked for opportunities to promote autonomy support over teacher control and to foster students' inner resources (choices, sense of challenge) as opposed to relying on extrinsic motivators (deadlines, consequences, teacher directives)."

Findings from these questionnaires were not conclusive and because of the small sample size (students who consented and those who completed all there surveys) it was difficult to draw strong conclusions. That being noted there was evidence that there was progression from a comparatively lower to higher level of self-confidence of one student who completed all 3 questionnaires and for another student they showed consistent levels of confidence on all three questionnaires. Loosemore also found that approximately half of the respondents who completed the first questionnaire reported high levels of self-confidence. Loosemore's research also yielded some interesting findings on goal-setting, with it becoming more precise throughout successive questionnaires.

In reflecting on the findings from his research, Loosemore says, Can we affirm the usefulness of "capability training" as a whole approach, based on the results? Perhaps not: We would need to see more data from a larger pool of persisters--especially, of course, for the longitudinal aspect of the study. Even

so, if we can't draw major conclusions or respond directly to the original question about the effect of capability training, I think there are grounds to say that the capability approach can have positive effects, helping at least some students to become more skilled and self-aware as learners and gain in self-confidence. I learned that it's possible to see fairly significant growth in students' ability to formulate more precise, action-oriented goals and plans. I also learned that confidence can be nurtured in a way that's uncoupled from achievement and performance. (Success at performance may well boost confidence, but it can also have the reverse effect, i.e. "imposter syndrome.") If we can teach students how to teach themselves, specifically how to identify areas for growth and how to locate relevant resources for themselves, their confidence in learning has nothing to do with a grade or praise.

How can an online video presentation assignment increase student performance with the course content?

Professor Ivan Su who teaches communication courses for the Department of English requires his students to do oral presentations, believing that it gives them the opportunity to put language and communication skills they have learned into practice. Su, however, faced familiar challenges that educators encounter when having their students present in class – the structure of classes was not conducive to presentations and scheduling made it difficult to squeeze presentations in, along with face-to-face feedback; not to mention student anxiety. As a possible solution Su decided to explore the possibility of student online video presentations.

Su's initial study which began as a TLHE704 action research project centered on one class of his COMM 170 course, comprising 30 to 35 students in their early twenties, mostly domestic, from a variety of different programs at the College. Students were given an oral presentation assignment, which was to analyze an essay. They were to record their analysis on video and upload it to the assignment dropbox. A separate class also in the COMM 170 course received the same assignment, but with the presentation being a traditional face-to-face one.

Su would use the rubric for this assignment to compare the two different classes. He also asked students who did the video presentations to complete a voluntary self-questionnaire on their perceptions of their performance.

Some findings were obvious, and others less so. The class performing the traditional presentations gained more experience with speaking to audiences, and unlike those doing the video presentation, could be more easily graded on their non-verbal communications skills. The face-to-face presentations were also easier for Su to evaluate, as they all followed a similar structure and all had roughly the same length. However, those students in the video presentations were more critical of the position of the author and of the paper they were presenting on in general. According to self-questionnaires by students who did the video presentations 67% of those who completed the questionnaire felt they did better with the video presentation, and a majority found that the format helped them analyze the essay's topics better. Of particular interest was that a majority of students indicated that they would like to do future assignments in this format, even in other classes.

Su's initial results were very interesting but did not point to a definitive conclusion. While marks were not noticeably better with the online video assignments, the greater willingness of students to criticize the author and the essay meant more class learning objectives were met.

Su continued to develop the research question more deeply through a SOTL research project that covered a full semester with his COMM 161 course students. He and his research assistant obtained consent from 35 international/ESL students to participate in the study. He refined his original research topic to discover:

- What are the challenges in delivering a presentation in-class and online?
- What is the effectiveness of using online video presentations to improve analysis-based outcomes?
- What are effective teaching strategies to help students with designing a video-based presentation?

Su collected data from individual graded presentation rubrics to compare:

1. graded performance scores between traditional face-to-face presentations and online presentations
2. graded performance scores with critical reading analysis outcomes between traditional face-to-face presentations and online presentations.

He also collected data from a self-created virtual online questionnaire to measure student perspectives on delivering traditional and online presentation assignments.

Research findings showed that online audio/video presentations can improve grade point percentages by at least 3% over traditional, in-class presentations. Much of this can be attributed to the ability to re-record presentations and making changes when needed. Students also noted that they felt less stressed or anxious in doing an online audio/video presentation.

In terms of improving critical reading analysis outcomes, the results did not show that participants who delivered an online audio/video presentation engaged in higher critical analysis. Comparative results showed grade point percentages were slightly lower than traditional face-to-face presentations by only less than 1%. One reason that can be attributed to this minor difference is that students who choose to create audio/visual presentations have to focus on more "technical" aspects of the presentation, which can adversely divert their attention away from expressing deeper critical elements of the reading topic. Despite the result, majority of respondents believed that doing presentation assignments whether they were online or traditional on reading topics would help them improve their critical analysis skills.

Another interesting conclusion drawn from the study was that the majority of international students would still prefer more traditional, face-to-face presentations as some of the respondents felt it was important to gain more confidence in speaking and establish an immediate connection to the audience as English is their second language.

From the study results, Su has recommended a strategy for implementing presentation assignments for a course. He suggests that course developers and instructors will need to provide learners with:

- An orientation of a select variety of easy-to-use, free software or editing tools for audio/visual presentations
- A sample audio/visual presentation for students to follow in a live face-to-face or fully online presentation assignment
- Opportunities for students to prepare the presentation assignment in stages to avoid "last-minute" presentation submissions
- Established conceptions of how presentation assignments meet course/program learning outcomes i.e. What is an oral presentation and its purpose? Should it involved critical inquiry to meet a certain outcome or should it just be a vehicle for information transmittal?

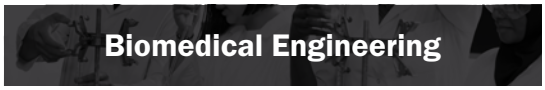
Su recognizes the limitations of online video presentations, but at the same time he recognizes their undeniable potential. According to Su "Yes, as I know there is not only one way to approach an assessment. In terms of UDL principles, it's important to give students multiple means of expression as there are options. Also, it helps me as an educator/ teacher to reflect on student opinion when they record an audio/video message. Students in turn can also self-reflect and give themselves multiple opportunities to re-record and perfect their delivery. I am not limited to the spontaneity of a live presentation which can be affected by various circumstances that are out of the student's control i.e. technology issues and public anxiety/stress. Finally, I wanted learners to be more critically engaged with the material, which sometimes cannot be fully accomplished with a live face-to-face presentation."

Videos of Teaching and Learning Research at Centennial College

View some of the SoTL Research Fund projects and TLHE704 action research projects undertaken at Centennial College

SoTL projects

TLHE704 projects



If you are interested in finding out more about Centennial's SoTL research grant visit www.centennialcollege.ca/centres-institutes/teaching-excellence-and-academic-quality/scholarship-of-teaching-and-learning/

Conclusion

It is clear from the scholarly literature and from the examples of SoTL initiatives at post-secondary institutions, including Centennial College that the benefits of SoTL are numerous, as are the challenges. If institutions of higher learning are to build a strong SoTL culture then they must be prepared to take on these challenges.

The numerous examples of teaching and learning research at Centennial College detailed in this issue of the digest is evidence that if institutions of higher learning are to thrive in the 21st century and beyond SoTL must be a fundamental part of their institutional culture.

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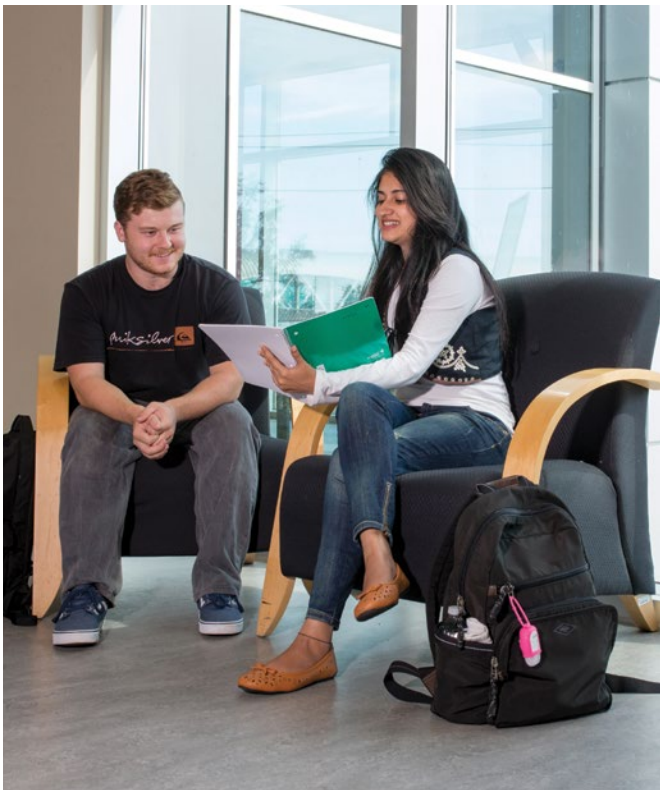

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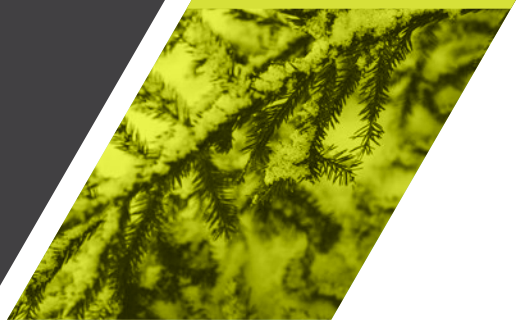

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