University of Waterloo Teaching and Learning Conference:

Teaching and Designing for Diverse Learners

2019 Program

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Keynote: 8:30 – 10:00 a.m.

Inclusive Instruction: Reaching and Teaching Diverse Students

Dr. Allison Lombardi, University of Connecticut

Today's postsecondary students are increasingly more diverse with respect to socioeconomic status, race and ethnicity, ability/disability, and age. As a result, instructors are challenged to meet the needs of this increasingly diverse student population, and consequently, are under more scrutiny than ever before to devise creative, innovative, and inclusive classrooms and courses. However, most instructors receive little or no formal pedagogical training in inclusive instruction. Based on the principles of Universal Design for Instruction (UDI), inclusive instruction offers a framework that can be utilized to guide and support instructors in course planning and delivery, as well as evaluating learners. While the potential of universally designed teaching approaches has been emphasized for the past decade, widespread implementation remains a persistent challenge. In the keynote presentation, Allison will:

1. provide a brief overview of the UDI theoretical origins as well as relevant research findings to date;
2. clarify differences between course modifications and accommodations, and why this is so important in supporting students with disabilities in particular;
3. engage conference participants in self-assessment; and,
4. share examples and practical tips for implementation in your course with regard to planning for and delivering instruction, as well as assessing student learning.

Allison Lombardi, PhD, is an Associate Professor at the University of Connecticut, as well as a Research Scientist with the Center for Behavioral Education and Research, and a Research Associate with the Center on Postsecondary Education and Disability. Dr. Lombardi studies the transition from adolescence to adulthood, with a particular focus on college and career readiness (CCR) and higher education experiences of underrepresented groups, including students with disabilities. She has experience in the development, field-testing, and initial validation of several measures intended for secondary and postsecondary students and college faculty.

In efforts to focus on diversity and disability in higher education, she has developed and facilitated workshops for postsecondary faculty focused on inclusive teaching and universally designed instruction. She's also continued to work on the validation and refinement of the Inclusive Teaching Strategies Inventory, a measure intended for college faculty that has been used in research studies across two- and four-year colleges in the United States, Spain, Canada, Germany, and Taiwan.

Since 2012, Dr. Lombardi has taught undergraduate and graduate courses in the Special Education Program in the Department of Educational Psychology. She's also the director of two online graduate certificate programs: (1) Postsecondary Disability Services and (2) Special Education Transition to Adulthood. Dr. Lombardi currently serves on the editorial boards of the Journal of Diversity in Higher Education, Journal of Special Education, Career Development and Transition for Exceptional Individuals, Teaching Exceptional Children, and the Journal on Postsecondary Education and Disability.

"Igniting Our Practice": 1:50 – 2:40 p.m.

Plenary Session

Carol Hulls. Mechanical and Mechatronics Engineering
Markus Moos, School of Planning

For this session, we asked two inspirational University of Waterloo professors to draw us into their disciplines and into the learning spaces they create for their students by teaching us a concept from their own courses. The methods they use are diverse, but the intention underlying them is the same: to ignite a passion for learning in all of their students about important disciplinary concepts and questions. We will reflect on and discuss the ways in which these methods might be designed, taught, and adapted in our own fields and within our own inclusive classrooms so that all students have equal learning opportunities.

Dr. Carol Hulls, P.Eng. is a Continuing Lecturer in the Mechanical and Mechatronics Engineering Department at the University of Waterloo. She has been teaching courses in programming, computer hardware, and robotics since 1999. Always looking to improve classroom learning, she has tried a variety of techniques including Tablet teaching, blended learning, and experiential learning, and she is a co-founder of the Engineering IDEAs Clinic. In 2016 she received the STLHE D2L Brightspace Innovation Award in Teaching and Learning. Her favourite day each term is "demo day" when the first year mechatronics engineering and mechanical engineering students demonstrate their course projects.

> In **Igniting Our Practice,** Dr. Carol Hulls invites you to remember how it was on your first day as an undergraduate student when you didn't know whether it was safe to put up your hand to ask a question, and you thought there was a single answer to every problem. Carol will present an example from the first lecture in her programming course that is meant to set the tone for the rest of the term, where discussion is encouraged and the answer can be different depending on the application or context.

Dr. Markus Moos is Associate Professor in the School of Planning at the University of Waterloo. His research is on the economies and social structures of cities, particularly the sustainability and justice implications of urban change. Over the past decade, he has taught courses at various levels on planning administration, planning history, public finance, location theory, statistics, research methods, and urban demography and generational change. He was graduate program director in the School of Planning from 2015 to 2018.

> In his **Igniting Our Practice** session, Dr. Markus Moos will involve conference participants in an interactive exercise from his first-year urban planning course that helps students define and understand the meaning of planning administration in practice.

Session 100s: 10:40 – 11:40 a.m.

Session 101 – Panel Discussion – Applying universal design: Small changes, big impact

Sarah Murray, Library
Kari Weaver, Library
Christine Zaza, Centre for Teaching Excellence

Panelists: Heather Cray, School of Environment, Resources and Sustainability; Simon Daley, Electrical & Computer Engineering; Carol Hulls, Mechanical and Mechatronics Engineering; Nickta Jowhari, Faculty of Applied Health Sciences; Daria Kondrateva, Faculty of Arts

According to recent advances in neuroscience research, there is no such thing as an "average learner" (Rose et al., 2013; Rose, 2016). Our students have diverse backgrounds, unique lived experiences and varying abilities, and these all affect how they learn.

The goal of Universal Design (UD) in education is to improve learning by considering the diversity in learners and the variability in how people learn. Universal design aims to benefit all learners, not just those with disabilities.

In this panel discussion instructors and staff will describe how they apply UD principles and student panelists will describe their experience in learning environments that have, and have not, been designed with UD principles in mind. This panel will demonstrate how making small changes can have a big impact on others. Participants will leave with ideas, resources, and an appreciation of common considerations involved in teaching with variability in mind.

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Session 102 – Workshop – Compassion, patience and professionalism: Navigating difficult grade negotiation conversations with diverse students at end of term

Laura Stoutenburg, Conestoga College

Lisa Trimble, Conestoga College

Many instructors feel tension when they anticipate the communications they inevitably receive from students at the end of term hoping to negotiate better grades. These messages can present a real challenge as we try to support students coming from a wide range of experiences, cultural understandings and perspectives. We often feel unprepared to navigate the sadness, anxiety, rage or persistence of some students. We may wonder if and how we can create 'grace and space' to hear students while still respecting our personal and professional boundaries. These complicated conversations require us to actively listen, validate student experience, propose ways to mitigate conflict and distress, compromise when possible and show compassion and kindness while maintaining academic integrity.

Participants will work through common scenarios as students initiate these conversations. We will take into account how cultural differences can shape and inform the negotiation process, and suggest possible ways to support anxious and distressed students at the end of the term. Strategies we can engage in early in the semester to anticipate (and hopefully prevent) many of these conversations will be addressed. Learning the tools to ensure students leave the dialogue feeling safe, validated and heard (even if the outcome is not what they were hoping for) can help students and instructors navigate these uncomfortable situations with grace and professionalism.

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Session 103 – Workshop – Creative writing and the community

Lamees Al Ethari, English Language and Literature

Carrie Snyder, English Language and Literature

Tasneem Jamal, Conrad Grebel University College

In March 2019, we will begin a SSHRC-funded, community-based project that connects immigrant and refugee women in the KW community with writers and artists who assist and mentor them in constructing, sharing and performing their life writing narratives. The X Page: A Storytelling Workshop is a 12-week project directed toward adult women who have come to Canada as immigrants or refugees, who have some written and verbal English skills, and who are interested in gaining skills in leadership, communication, and storytelling. Participants do not need a background in creative writing or performance. The project brings together people from different disciplines in the Humanities. We would like to share this experience with other educators to demonstrate the potential impact that workshops like these have on our diverse community.

The 11th annual Teaching and Learning Conference is the perfect platform to share our pedagogical strategies and engage other educators through a sample creative writing workshop session. The workshop will shed light on the work our collaborating artists are doing and open a conversation on strategies for developing similar workshops in the wider community to support and encourage diverse forms learning.

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Session 104 – Presentations

104a – Student engagement and the international learner: Targeting the social and affective domains of learning for heightened course engagement

Keely Cook, Renison University College

Jane Karanassiou, Renison University College

The concept of student engagement (SE) is firmly entrenched in discussions and research surrounding teaching and learning (Kuh, 2009). The various ways in which SE is conceptualised and identified, however, has led to much theorising and debate, raising criticisms over too much emphasis on the generic learner to the exclusion of more culturally and linguistically diverse student populations (Kuh et al., 2006; Trowler, 2010; Zepke, 2014). This presentation incorporates the findings of a study conducted among a sample of first year international students within a university pathway program. Drawing upon Kahu's (2013) SE framework examining the antecedents and consequences of SE, this study explored the intersection between pedagogical inputs to engagement and success outcomes for these international students. Student stories, instructor observations and engagement scales, measuring student perceptions, behaviours and attitudes, were used to investigate how SE and student success manifested within the learning experiences of the research participants.

Research findings indicate that students who perceived a strong presence of course-based inputs to engagement also tended to believe themselves to be more engaged and more successful. In particular, the majority of these international students valued and were positively influenced by the social and affective aspects of their learning environments, including opportunities for structured peer and instructor interactions, active and collaborative learning tasks, and having supportive teachers. Earlier research comparing international and domestic SE suggests that these pedagogical factors have a more pronounced effect on the success outcomes of international students (Zhao et al., 2005; Zepke et al., 2008; Meeuwisse et al., 2010), and can lead to, as found in this study, increased confidence and sense of belonging. This presentation, therefore, aims to use these findings as a basis to offer a set of strategies for course design and instruction that may help to advance the engagement of our international students.

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104b – Active learning: Strategies for engaging international students

Sarah Mayes-Tang, University of Toronto

In this practice-based presentation I will share strategies for engaging diverse groups of students in active-learning spaces. With research demonstrating the effectiveness of active learning strategies and increasing institutional support for active learning, where do international students fit-in?

The active learning classroom provides many challenges for international students. For example, research suggests that many international students are less comfortable working with peers than students from North America. This knowledge - along with negative experiences - can dissuade many faculty members from pursuing active learning in classes with a large proportion of international students.

On the other hand, the active learning classroom provides opportunities to build community between international and Canadian students that are not as readily available in traditional lecture-style classes. Work with Ontario university students has revealed that international students often come to Universities excited to engage with Canadian students, but that cultural and language barriers can make it difficult to work with Canadian students. How can we overcome these barriers, and leverage the classroom as a community-building space?

The objectives of the presentation are to:

(1) Make participants aware of the challenges and opportunities that the active learning classroom provides to international students

(2) Equip participants to implement structures and activities in their own classrooms that are more inclusive of international students, by introducing concrete examples

The practices that I share will be grounded in research and based on my experiences teaching introductory calculus classes of 200 to 400 students using active learning methods. These classes have included up to 60% international students.

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104c – Changing bodies, changing minds: Teaching postcolonial, gender, and intersectional theories through speculative fiction*

Meghan K. Riley, English Language and Literature

Meghna Bellani, English Language and Literature

The presentation will consist of an overview of my Winter 2019 Science Fiction course and the adjacent study of the course goals, which was funded by a LITE Seed Grant. By introducing postcolonial, gender, and intersectional feminist theories to students in conjunction with reading and viewing speculative fiction which examines the tension between essentialism and hybridity, I argue, students can engage with the theories more effectively, achieve attitudinal change, and imagine the world differently. These theories are not without precedent; Sherryl Vint, for instance, argues that speculative fiction is ideally suited for the practice of Theresa De Lauretis' theory of reverse discourse, in which the world is "reworked through fantasy" and articulated anew and differently (21). However, my paper seeks to provide explicit grounding in pedagogy. My theoretical framework will be rooted in Paulo Freire's concepts of conscientization and critical consciousness (19, 44). I posit that because of the gradual identification of readers with the characters and situations which they encounter in speculative fiction, particularly the destabilized bodies and shifting worldviews, speculative fiction can both provide a valuable introduction to postcolonial theory and assist students in achieving the first level in critical consciousness, "conscientização" (Friere 19). In as much as speculative fiction actively and consistently encourages its readers to consider how reality might be different if certain underlying factors were to be altered even slightly, it provides postcolonial speculative fiction a base from which to imagine the world differently, and thus to begin to question one's assumption of reality as static and inevitable, rather than determined by "causal and circumstantial correlations" (Friere 44). This presentation will focus on the course design, methodology of the study, and unexpected challenges - both in logistics and the material itself - of teaching the course.

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Session 105 – Presentations

105a – Bringing statistics to the learner: Tailoring material to match student passions

Diana Skrzydlo, Statistics and Actuarial Science

Greg Rice, Statistics and Actuarial Science

Dina Dawoud, Statistics and Actuarial Science

How can you motivate students to learn a required subject they don't think is relevant to them?

All math students, including computer science (CS) students, are required to take two courses in probability and statistics. However, these courses were designed with math students in mind, and the particular relevance of statistics to CS was not typically pointed out. Computer science students' performance in these courses was historically lower when compared to that of other math students.

A pilot program began in Spring 2015 to offer a separate section of the first probability course, STAT 230, specifically aimed at computer science students. In class, the instructor focused on the CS applications of the

course material, but the students had the same tests and exams as the non-CS students. The anticipation was that by inviting the CS students to see the applicability of probability to their chosen field and personal interests, they would be more motivated to learn the material and their performance would improve.

Through several terms of iterative improvement we believe the program was a resounding success. This has been validated by feedback from students and by examining the outcomes in final grades, where the performance gap has been almost completely closed.

This presentation will discuss some of the challenges and successes we had along the way, including how the iterative improvement progressed, the student feedback results, and the quantitative impact on student grades. The problem we faced is not limited to CS students in Statistics courses, so we will also give attendees the chance to examine how their existing courses can be tweaked to reach and motivate sub-populations of students that are under-served by the current course design. Participants will come away with tangible ideas for making their material relevant to students and empowering them to learn and succeed.

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105b – Design and assessment of a hybrid engineering laboratory course with the incorporation of student-centred experiential learning*

Mingqian John Zhang, Chemical Engineering

Cheryl Newton, Chemical Engineering

Jason Grove, Chemical Engineering

Mark Pritzker, Chemical Engineering

Marios Ioannidis, Chemical Engineering

Increasing emphasis on enhancing learning experience and fulfilling required learning outcomes specified by CEAB and UDLEs requires alternative laboratory format for engineering laboratory course. While an open-ended laboratory format focusing on students designing their own lab experiments is widely adopted to replace a tradition laboratory (TL) based on "cookbook" instruction. The efficiency and sustainability of a laboratory course of all open-ended laboratories have been a subject of concern. This proposal discusses the effectiveness of incorporating both lab formats into a senior chemical engineering laboratory course. The open-end project-based laboratory (PBL) in this study, differing from most other open-ended laboratories, includes an authentic design component aimed to (1) enhance student curiosity/motivation, (2) cover all the required learning outcomes, particularly high-level learning outcomes such as "design", "life-long learning", 'application of knowledge", and (3) develop advanced engineering skills such as critical thinking and problem-solving.

The instruction and assessment of student learning were implemented summatively for TL and formatively for PBL. Survey questions based on the CEAB learning outcomes were used to assess student learning experience and outcomes. The results show that TL can be both effective and efficient in fulfilling learning outcomes for content-intensive components such as knowledge acquisition and experimental design, whereas the PBL is more effective in fulfilling all the required learning outcomes and developing the advanced engineering skills. The survey results also indicate that the formative instruction and assessment in the PBL, focusing on promoting student interest using real-world design and providing timely and constructive feedback, has brought about deep learning and high-level student satisfaction. The effectiveness and efficiency of the hybrid course are discussed in terms of the

learning models (behaviorist learning for TL and constructivist for PBL) and the benefits of the iterative design cycle. Implication of the results on a well-balance lab course sequence is also discussed.

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105c – Redesigning course labs to increase student engagement and improve learning outcomes

Allyson Giannikouris, Mechanical and Mechatronics Engineering

Chris Rennick, Mechanical and Mechatronics Engineering

Over the last year, the existing laboratory exercises in a third-year course have been replaced by a scaffolded, collaborative project to improve learning outcomes for the increasingly diverse student body. The prior labs were no longer meeting the needs of the course: they were ineffective at engaging students with diverse backgrounds and skillsets, and were now far removed from the experiences students were having during their work terms. This project was designed to satisfy student needs as defined by Self-Determination Theory.

Self-Determination Theory (SDT) describes three psychological needs to drive self-motivation (i.e. intrinsic motivation) and growth tendencies: the need for competence, relatedness, and autonomy [1]. Summarizing the results from Prince [2], and from Niemiec and Ryan [3], a high-impact learning experience that leads to intrinsically motivated students will be active and collaborative, and grounded in a realistic and relevant context for students. This activity should provide students with a sense of autonomy, and they should be supported by the instructor to develop their self-efficacy and problem-solving skills.

This presentation will describe the updated project implementation – including challenges faced in implementation – with an emphasis on how the project aligns with Self-Determination Theory and best practices for active learning in STEM [2] [4] [5]. The presentation will also discuss how the project was designed to balance student workload in a difficult term, while still providing a high-impact learning experience for students.

The impacts of this updated project have been measured using pre/post surveys, and a review of course critique scores. Data from the first two offerings show that student perception of the course overall has improved, and their perceived skill level with targeted skills has been improving overall.

References
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Session 106 – Presentations

106a – Controversial issues discussions in post-secondary classrooms*

*This is a University of Waterloo [Learning Innovation and Teaching Enhancement (LITE) Grant](#)-funded project

Christina Parker, Renison University College

Kristina Bartold, Student Success Office

This presentation will focus on research we conducted on how postsecondary students engage in classroom discussions about controversial topics, related to social, political, and cultural issues, and how instructors' pedagogies facilitate healthy and inclusive engagement during the discussion of contentious and sensitive. The literature on classroom discussion in postsecondary contexts points to the benefits for student learning and increased involvement in their postsecondary experience (Akman & Alagöz, 2018; Rocca, 2010). Still, most research on classroom discussion largely ignores students' diversities and draws on multiple interpretations of what classroom discussion looks like in practice (Dudley-Marling, 2013). Through a literature review, interviews with instructors, and questionnaires with undergraduate students this exploratory and on-going project seeks to understand how university courses focused on social issues and social justice, broaden students' perspectives about conflict and diversity and how their engagement with diverse and dialogic pedagogical tours may have encouraged students participation and engagement and subsequent interest and enthusiasm about the political and social landscape in their respective communities. This presentation will provide a preliminary overview of findings, followed by a short opportunity for discussion among attendees.

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106b – Leveraging safe spaces for leading across differences

Nouman Ashraf, University of Toronto

In this 20-minute presentation, award-winning professor of Management Nouman Ashraf will share his insights on how to use the topic of diversity and inclusion to engage diverse learners. Professor Ashraf will discuss his Leading Across Differences course, in which undergraduate students are asked to actively contribute to creating, enabling and sustaining an integrative learning environment.

In Leading Across Differences, a teaching approach based on the classroom as a "safe space" provides students with a community space in which they feel free to share ideas without personal judgement. While initially uncomfortable, this discomfort enables students to learn from their differences and to engage in deep learning, which is possible only when students can immerse themselves in the experience without fear of judgement. This model draws on Bain (2004) and discussion of mental models.

Through a brief safe space exercise and a discussion of how the model functions in practice, this interactive presentation will explore ways in which participants can leverage safe spaces in their own teaching in order to engage diverse learners. Participants will explore how to locate the experiences of the learner in how they design pedagogy, specifically by engaging students in consistent feedback and incorporating student insights into each

subsequent course offering. Participants will leave with a better understanding of how to apply the aforementioned approaches within their own institution to engage diverse learners.

Reference

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106c – Hands-up, hands-down: Embodied pedagogy for diverse learners

Matthew Bailey-Dick, Conrad Grebel University College

Humans live, breath, and learn as holistic creatures, yet our educational systems usually function as though knowing takes place only in the mind. This presentation will explore several strategies for incorporating embodied activities into the university classroom, and it will encourage participants to use, adapt, or design such activities within their own disciplines. This approach not only includes more of the human body into the educational project, but it also advances a farther-reaching goal having to do with recognizing and celebrating human diversity. Every body is different, and through creative, strategic, and sometimes playful movement, our diverse bodies themselves can offer both figurative and literal scaffolding for the process of learning. The presenter will share a two-fold model of embodied content pedagogy and embodied process pedagogy, and will offer a selection of resources based on both academic teaching and non-formal workshop facilitation. More specifically, the presenter will (1) describe several embodied learning activities from an undergraduate Peace and Conflict Studies classroom and a death education project, (2) explain the impact of these activities among the learners, and (3) suggest transdisciplinary ways to design for embodiment in both educational content and educational process. By the end of the presentation, participants not only will be able to identify basic components of a pedagogy for embodied learning, they will also gain an appreciation for an important limitation having to do with justice and diversity – namely, the fact that embodied learning can exclude people for a whole variety of reasons, especially if what is playful or creative for one person becomes oppressive or prohibitive for another. Especially in a diverse community like the University of Waterloo, we should raise our hands only if embodied pedagogy contributes to justice-minded, justice-bodied education.

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Session 200s: 11:50 a.m. – 12:50 p.m.

Session 201 – Workshop – "Fair for all?" Rethinking traditional assessments to promote inclusivity in STEM

Gitanjali Shanbhag, Mechanical & Mechatronics Engineering and Centre for Teaching Excellence

When students feel capable of succeeding, they are more motivated to learn (Svinicki, 2004). It can be frustrating and de-motivating for students and instructors when students' hard work does not result in the outcomes they expected. For many students, this gap between effort and performance can be related to the fact that they are still developing metacognitive thinking skills. Metacognition includes the knowledge of cognition (knowledge about oneself as a learner, knowledge about learning strategies, and knowledge about why and when to use a given strategy) as well as the regulation of cognition (the ability to plan, monitor, regulate and evaluate one's own learning process) (Schraw & Moshman, 1995). Research shows that effective learners apply metacognitive skills and use strategic learning approaches to their studies (e.g., Ku & Ho, 2010; Miller & Geraci, 2011; Simpson & Nist, 2000).

When they arrive at university, many students are still developing into adult learners and would benefit from explicit instruction on metacognitive skills (Simpson & Nist, 2000). In this session we will present a variety of strategies that instructors can readily incorporate into their courses to foster metacognitive skill development in students. After a brief presentation on metacognition, our panel of instructors from Arts, Engineering, Environment, and Science will describe how they have embedded metacognitive strategies into their undergraduate courses. Participants will have the opportunity to think about how to apply these strategies to their own classes.

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Session 202 – Workshop – Beyond the clicker: Engaging diverse learners through quantifying participation

Shannon Webb, Durham College

So often faculty talk about wanting to get their students engaged in the classroom, and they sift through a variety of active learning strategies in the hopes of finding something that will boost community and participation. Consider the added challenge of having upwards of 60 diverse learners in one room; how do you encourage each of them to participate with the course content in a way that makes them comfortable and supports their learning? My framework allows me to quantify participation (in process, attendance, student engagement etc.) grades in a way that meets a variety of students' needs. By quantifying the process and encouraging all diverse students to engage in a way that works for them, it ensures no learner is excluded from the grading or punished for not participating like the other students. It's also a simple system to implement and administer throughout the term. This session will introduce the quantifiable participation grade framework that has been proven to boost overall student engagement (and marks!) and help to acknowledge learners from all backgrounds. We will discuss the framework and how you can implement it for your diverse learners. Resources will be made available to workshop participants for implementing in their own classrooms.

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Session 203 – Presentations

203a – Disability awareness videos: An educational tool to promote faculty members' disability-related self-efficacy and inclusive teaching practices

Emily Tarconish, University of Connecticut

Allison Lombardi, University of Connecticut

Students with disabilities are attending postsecondary education at rates that continue to increase (Newman & Madaus, 2015). As such, there is a need for postsecondary faculty members to learn about the experiences and needs of this growing population, as well as to improve their abilities to effectively instruct these learners. Researchers have found that participating in disability-related training opportunities can improve faculty members' perceptions of students with disabilities and familiarity with how to assist these students (Rohland et al., 2003; Sowers & Smith, 2004; Murray, Lombardi, Wren & Keyes, 2009). However, universities may struggle to find the financial and personnel resources to orchestrate large-scale or in-person trainings. This presentation will discuss the development of disability-awareness videos as a professional development tool for faculty and the process used to assess their effects on faculty members' disability-related self-efficacy (Murray et al., 2014).

Each video addresses one of four disability-categories: ADHD, anxiety & depression, autism spectrum disorders, and traumatic brain injuries and featured interviews from students with disabilities about their experiences, typical accommodations and strategies, and information involving how to best assist and accommodate these students. Finally, a fifth video features how to incorporate principles of universal design of instruction into classes and how to make courses accessible to the greatest number of learners. The presentation will provide an overview of the process of creating the videos, as well as the ongoing project to assess their effects on faculty members.

Learning outcomes for the presentation include participants' gaining an understanding of the process of collaborating with various campus offices and students with disabilities to create awareness videos, as well as the process used to assess their effects on university faculty.

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203b – Beyond accommodation: Supporting inclusive learning for disabled students

Ness Lamont, Knowledge Integration

Kristin Brown, Centre for Teaching Excellence

Disabled students have variable needs that sometimes cannot be easily predicted, and some disabled students may not register with AccessAbility Services for a variety of reasons. At the University of Waterloo, 5% of undergraduate students are registered with AccessAbility Services, however the most recent National College Health Assessment (NCHA, 2016) data shows that about twice as many students experience disabilities that impact their learning. How, then, do we help create inclusive learning experiences with "unaccommodated" disabled students in mind?
To better understand these challenges, this presentation presents findings from semi-structured interviews with disabled students at the University of Waterloo, centering their voices, concerns, and suggestions along with best practices research. Challenges identified include difficulties meeting deadlines, falling behind without being noticed, time management and scheduling, collaborations and group projects, and expectations and motivation. Potential suggestions include managing deadline difficulties for large projects, testing familiarity and practice, building an inclusive community, supporting motivation and capacity to succeed, and ensuring failures are not final.
Participants will understand the impacts of barriers in their classrooms and be provided with recommendations from students to help reduce the impact of these challenges. While disabled students and their needs are not

always identifiable, taking steps to reduce barriers and facilitate their engagement improves the learning experience for all, regardless of ability.

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203c – Learner-inclusive design: Students as collaborators in creating their own course

Abhinav Bhatnagar, Western University

Rebecca Cambridge, Western University

Mona Matan, Western University

Tom Haffie, Western University

Lindi Wahl, Western University

Faculty at Canadian universities invest heavily in developing undergraduate students as colleagues in disciplinary research. In contrast, we invest little in developing undergraduate students as colleagues in the scholarship of disciplinary education. Students are seldom provided with opportunities to collaborate with faculty in projects addressing teaching and learning challenges.

Partnerships between faculty and undergraduate students offer tremendous opportunities to engage the interest, creativity and shared goals of our students toward improving the educational experience of both learners and teachers. Engaging colleagues in this broad idea, through the example of the course described below, is the desired learning outcome of our presentation.

Students as Partners (SaP) is an international initiative that promotes engagement of students in a wide variety of educational settings as consultants, evaluators, co-researchers, co-designers, and co-instructors (Allin 2014; Bovill et al. 2011, 2016; Carey 2013). In SaP projects, students work *with* faculty members rather than *for* them on diverse initiatives including classroom observation, course development, curriculum design, and educational research.

As one component of a larger Students as Partners project at Western, we have had the privilege of participating as faculty and student co-designers of a half-term undergraduate science course entitled "University Science Education". In the proposed session, we will present our experience with this process of collaborative course development, which included significant student-selected content and assessment, as well as content delivery by students. Our presentation team, which will include both students and faculty members who were members of the course, will outline both the strengths and pitfalls of this collaborative course design model. The presentation will include reflections by student participants on the impact of the course and the SaP course design process in particular. Our experience shows that faculty/student collaboration in course design can be an important vehicle for expanding inclusive education.

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Session 204 – Presentations

204a – Understanding internationalization - An Ontario College student and faculty context

Adam McGregor, St. Lawrence College

Christina Decarie, St. Lawrence College

Wendy Whitehead, St. Lawrence College

How can we recognize the diversity of learners in our classroom?

This information session will lead participants through an exploration of an action research project, conducted by college faculty, in a rapidly internationalizing program of study at an Ontario college. While this will be a high-level overview, demographics, economic forces, policy considerations, academic backgrounds and performance, and more, will be discussed. Participants will leave the session with ideas and actions they can add to their practices and bring back to their programs and institutions. This research project is part of a nomination for a 2019 CICan Award (Colleges and Institutes Canada Awards of Excellence Program).

Background:

"Internationalization in the School of Business", St. Lawrence College, is a response to rapid internationalization and the need to ensure the success of all learners, domestic and international. This research project investigates international student data, including grades; a literature review, including articles relevant to Ontario colleges and their policy environment; and surveys of students, staff, and faculty. The research connects internal and external stakeholders, including community agencies and institutions, laying the groundwork for collaboration and shared goal/initiatives. While the research is ongoing, it has already informed intervention strategies promoting student success, including a student-led tutorial model for courses identified as most challenging, and a "re-orientation" for second-term students, addressing academic success and the desire for more intercultural relationship building. Ultimately, this project aims to build intercultural competence in our students, staff, and faculty, allowing the St. Lawrence College School of Business to continue to produce high quality, career-ready graduates in this new era of internationalization.

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204b – The changing face of post-secondary education: Supporting international students

Heather Nelson, Saskatchewan Polytechnic

The number of international students attending post-secondary institutions worldwide has grown dramatically over the last 10 years. Globally, international student numbers are expected to reach 8 million by the year 2025 (Altbach, 2013, p. 9). Canada has seen enrollment gains of 67% from 52,650 in 2002 to 87,798 in 2009 (de Wit, Ferencz & Rumbley, 2012). International students faced the same challenges adapting to student life that all students experienced, but, additionally, faced a range of academic, social, financial, and basic life skills challenges (Carroll & Ryan, 2007; Gunawardena & Wilson, 2012; Perry, Lausch, Weatherford, Goeken & Almendares, 2017). The objective of this presentation is share this authors thesis results on the institutional and individual factors that make up the international student experience in post-secondary education.

The research question that guided the study was, "How can Saskatchewan Polytechnic better support a growing international student population?" Six interviews and four focus groups were performed with managers, department heads, instructors, student services staff, and international students. Two themes emerged from this study. The first theme was institutional factors with four sub themes of orientation, communication, admissions, and supportive staff. The second theme was individual factors with sub-themes of academic experience, language, basic necessities, and social experience. The relationship of these findings to the literature will be discussed. The recommendations introduced at Saskatchewan Polytechnic based on this study and the applicability to other institutions will be examined.

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204c – "It's really, really hard" Understanding factors that impede learning by international students at Renison University College

Colleen McMillan, Renison University College

Grant Leach, Renison University College

Kevin Li, The Problem Lab

Alexandra Chin, Applied Health Sciences

Hayley McDonald, Applied Health Sciences

Waterloo's strategic vision for internationalization includes supporting globally literate and world-ready graduates. However, the challenge in achieving globally literate student citizens can be a complex process. Our study aimed to identify and better understand existing pedagogical factors that prevent optimal learning by international students either registered through various programs at Renison University College or living in the residence. While we knew from the literature that acculturative stress (Meng, Zhu, & Cao, 2018) was associated with the length of time in the host institution (Nasirudeen, Wat Neo, Adeline, et al) we also wondered what other barriers existed that made learning more challenging for this group of learners (Wu, Garza & Guzman, 2014).

Working with the Problem Lab, we did an environmental scan of Renison's culture that involved in-depth interviews and focus groups with 87 stakeholders. A cross section of perspectives were collected from the President, Vice President's, Professors, Part-time Sessional Instructors, Managers and Directors, kitchen staff, janitorial staff, reception, and of course domestic and international students from all programs.

Using a thematic analytic framework, we identified themes that spoke to pedagogical facilitators and barriers within the Rension learning culture. Barriers included omnipresent social and familial pressure to excel academically, mental health issues and the ways they were addressed, and the lack of time for leisure and social activities. What also emerged were issues that extended beyond the classroom such as the importance of food and cultural activities to reduce loneliness. Facilitators included the presence of lounge space that encouraged organic conversations and relationships to develop between international and domestic students. International students also appreciated the proximity of classrooms to residences, especially during winter months, and College wide events that engaged all students, as compared to only international students.

Learning outcomes of this session will focus on the importance of contextualizing classroom teaching and student learning issues within the larger distal culture. Student suggestions will be shared in how just focusing on teaching is insufficient to critically support a positive international experience.

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Session 205 – Presentations

205a – Thinking interactively: Toward a more robust E-learning experience*

*This is a University of Waterloo [Learning Innovation and Teaching Enhancement (LITE) Grant](#)-funded project

Dorothy Hadfield, English Language and Literature

Bruce Dadey, English Language and Literature

Jason Lajoie, English Language and Literature

Genres of Business Communication (ENGL 210F) is an online course offered by the English Department each term to between 200 and 250 students. The course is a business simulation in which students work as interns in a fictional company, writing and exchanging business documents with other students, all within a context set by various course scenarios. The course co-authors received a LITE grant to make the simulation environment more robust and immersive, and to reduce dependency on the textbook by moving toward OER and custom-built content.

As Luis Palacious and Chris Evans point out, successful e-learning design has to take into account "the environmental and contextual characteristics" of digital environments, moving beyond the mirroring of non-digital teaching methods (3). Applying these principles to the development of the course's OER resources, we determined that the content presentation should take fuller advantage of the unique interactive affordances of the digital medium to enrich the level of interactivity already provided by the simulation environment.

This presentation describes how we are using Articulate Storyline, an e-learning authoring platform that is LEARN-compatible, to create interactive activities that communicate course materials in a more engaging, immersive, and active manner. We will describe the process we went through to match digital activity options to course objectives, examine the challenges of re-framing course materials so that they can be presented interactively, and explore how a focus on interactivity has affected the overall course structure. We hope our account will be helpful to others who are authoring online courses and would like to create a more digitally robust e-learning experience.

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205b – Evaluation of an online module for weight-sensitive instruction in university classrooms: Preliminary results from a pilot study*

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Kirsten Lee, School of Public Health and Health Systems

Katie Burns, School of Public Health and Health Systems

Katelyn Godin, School of Public Health and Health Systems

Weight bias and discrimination are incredibly common (1) and significantly manifested through public health messaging and health care interactions (2–4). In the faculty of Applied Health Sciences (AHS) at the University of Waterloo, many health courses include topics related to obesity; however, there is a glaring lack of attention to weight bias as a pressing health concern within their curricula.

Drawing upon both critical fat pedagogy (5,6) and health-centred obesity discourse (7,8), we developed a pilot project involving (a) two separate online educational modules (for students and instructors) with content related to weight bias and discrimination, as well as appropriate language and use of non-stigmatizing images, and (b) a brief feedback survey querying students and instructors about their engagement with the module, its influence on their attitudes, and its usability.

In the first term of implementation, 154 undergraduate students completed the survey. Most respondents found that the module was easy to use (97%), easy to understand (97%), and "just the right length" (76%). The majority agreed that the module provided useful information about weight bias and stigma (82%) and that it taught them skills applicable to their current or future work environments (71%). Overall, just under half of respondents agreed that the online module challenged their personal perceptions about weight bias and stigma, and one third agreed that their views towards individuals affected by overweight and obesity have changed. Students additionally identified the strengths and weaknesses of the module, and provided their perspectives on its content.

The preliminary results of this pilot project indicate that the online module is user-friendly and has a modest impact on weight-related biases and beliefs. This study provides justification for the integration of weight-sensitive online education into AHS courses and for future research into its effectiveness across faculties.

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205c – Audio feedback as a tool to enrich student understanding of qualitative evaluations

Sarah McLean, Western University

As academics, we understand the importance of feedback in order to improve. The extent to which students receive quality feedback on assignments can vary. From the instructor point of view, providing detailed written comments can be time-consuming, and may or may not be read by students. In this session, I will share my strategies for providing audio comments as a form of meaningful feedback to students for both formative and summative assessments. In my experience, audio feedback is particularly beneficial when an assessment is more qualitative in nature, such as a written assignment or an oral presentation. This type of feedback can be timely, more personal, and less formal in nature- all aspects that can support student learning and metacognition. Participants in this session will learn about the pertinent pedagogical research to support this approach. Participants will be presented with multiple examples of audio feedback and simple tools to easily implement this type of feedback. Finally, participants will hear about the utility of this approach from both students and instructors.

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Session 206 – Presentations

206b – Oh the humanity! The challenges of immersive assignment integration into an established undergraduate course*

*This is a University of Waterloo [Learning Innovation and Teaching Enhancement (LITE) Grant](#)-funded project

Luc S. Cousineau, Recreation and Leisure Studies

Corey W. Johnson, Recreation and Leisure Studies

Kelly Anthony, School of Public Health and Health Systems

Foram Patel, School of Public Health and Health Systems

Making changes to any established core undergraduate course can be difficult, especially if those changes involve different pedagogical approaches, different level of students, and the inclusion of new and multiple stakeholders in the learning process. Our enthusiasm and good ideas sometimes surpass our abilities and our own desires for quick movement and significant change might not be in step with institutional requirements. But we should not let that deter us from thoughtful experimentation. This presentation will discuss the pedagogical, human, and institutional dimensions that came into play as we attempted to integrate a fully immersive assignment option into a course on Leisure and Social Justice in the Recreation and Leisure Studies program, as part of a LITE Seed Grant. The opportunities, challenges and pitfalls we encountered through assignment design, implementation

with community partners, the difficulties of working with undergraduate students on multi-dimensional projects, and the complex interactions through the ethics review process will each be discussed as we prepare for round two in Fall, 2019.

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206c – Teaching diverse learners about aging through research and reflection*

*This is a University of Waterloo Learning Innovation and Teaching Enhancement (LITE) Grant-funded project

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Christine Sheppard, School of Public Health and Health Systems

Saman Husain, School of Public Health and Health Systems

Vanessa Bach, School of Public Health and Health Systems

Souraiya Kassam, School of Public Health and Health Systems

In social work and gerontology, field work and reflexive assignments have been shown to enhance understanding of aging principles (Hamon & Koch, 1993), combat ageist stereotypes (Oggins & Whitlow, 2002), and promote empathy towards older adults (Zucchero, 2011). While reflexive assignments are a common practice in the field of social gerontology, we do not know how effective they are for students from other disciplines. This presentation addresses the aforementioned gap by examining students' experiences with an assignment in the Sociology of Aging course offered to the students in health, kinesiology, recreation & leisure studies, and sociology. To complete this assignment, students had to interview an older adult, summarize the life story of the participant, analyze it using a theory, and reflect on the process. Our goals were to (a) examine students' experiences of completing this assignment; (b) determine if and how this assignment enhanced students' understanding and appreciation of the aging process; and (c) identify how students' program of study shaped their experience with the assignment. Analyzing 77 assignments and 10 semi-structured interviews, we learned that many students found it challenging to recruit an older adult to participate in the interview, but all found the actual interview process to be extremely rewarding and beneficial for their learning. Our analysis of the reflections revealed that students were able to apply what they learned from the interview to their own life, but struggled with understanding how their life is similar or different to the older adult and with finding connections between the life story and course material. An examination of reflection quality (i.e., descriptive, analytical, or critical) demonstrated that critical thinking was a challenge for student in all disciplines. We conclude with a suggestion that research-based and reflexive assignments can benefit diverse groups of learners from various academic disciplines.

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Session 300s: 3:00 – 4:00 p.m.

Session 301 – Workshop - Authoring digital learning materials

Tonya Elliott, Centre for Extended Learning

Jane Chomyc, Centre for Extended Learning

Teaching and designing for diverse learners has led to classrooms becoming increasingly digital. For example,

- Low- or no-stakes quizzes promote retrieval practice and allow instructors to present assessments to students in a way that helps students learn, rather than solely measures student learning.
- Assistive technologies remove barriers and level the playing field for students and instructors with various disabilities.
- Many courses are replacing costly textbooks with open educational resources (OERs).
- Asynchronous discussions boards make it possible for all students to engage with their peers and present diverse viewpoints in class discussions.
- Instructors who wish to spend class time working through assignments can still cover content by designing blended classes, where students review instructional materials online, and on their own time.

Additionally, the number of fully online courses and programs offered at Waterloo, across Canada, and around the globe continues to grow - opening doors for mature students, those who live in remote communities, and other non-traditional students.

If you are considering whether or how to include more digital material in your classroom, or you're thinking about building a fully online course, come talk to us!

In this workshop, we'll highlight how digital learning materials address the needs of diverse learners and inform participants of the workload implications and ways in which authoring time and resources may be used inefficiently when creating such materials. We'll walk participants through exercises that demonstrate cognitive principles as they apply to all learners, offer design and development tips, share sample lessons and activities, and provide participants with checklists to summarize our key takeaways. Plenty of flexibility will be built into the workshop; the emphasis of our discussion and the sample lessons and activities we demo will reflect the interest of participants.

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Session 302 – Presentations

302a – Using Lego in the classroom: Experimenting with kinaesthetic learning in an English class

Clive Forrester, English Language and Literature

Kinaesthetic learning has long been acknowledged as a legitimate learning modality for children in elementary schools ever since the pioneering research of Dunn and Dunn (1978). While there is no reliable evidence to suggest that "learning styles" constitute a useful pedagogical label, recent research suggests that learning strategies are a promising replacement for this. Among the various learning strategies, the use of concrete examples which rely on engaging tactile stimuli has been used to great effect by teachers in virtually all levels of education across a variety of subject areas. Noticeably absent from this trend, however, is teaching at the university level.

In this paper, I discuss my attempts to design concrete examples by the inclusion of kinaesthetic stimuli in two English courses taught at the University of Waterloo. In one experiment, in a technical writing classroom, students use Lego bricks to construct made-up consumer products and then design the instructional manuals which accompany them. In the second experiment in a linguistics classroom, students construct sentences based on a "language" patterned on Lego bricks - *Legonese*. In both instances, I discovered that this untapped modality opened up new avenues for deep learning with minimal reliance on conventional lecture-style teaching common in higher education.

Though my experiments occurred within the context of English courses, this discussion has at least one learning outcome for educators in other disciplines. Specifically, I highlight strategies for conceptualizing abstract ideas in a lesson as a physical puzzle which learners must solve.

Reference

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302b – Gameful studies: Reimagining participation to support student motivation

Nicholas Hobin, English Language and Literature

This paper draws on Aguilar, Holman, and Fishman's articulation of "gameful design", which uses games as inspiration for changes to the type and structure of tasks given to learners, with the goal of facilitating intrinsic motivation. Specifically, it explores how participation grades might be reformulated to bolster each student's sense of autonomy and competence, using the example of my recent *ENGL 294 – Game Studies* course.

My goal was to encourage a sense of "gamefulness" – a term which Deterding et al identify as the experiential and behavioral quality of games, and which falls under the umbrella of their definition of gamification. To do this required me to address the structure and type of the assessments used in the classroom, with the goal of increasing the opportunities for students to have autonomy while mitigating the impact of failure. The aim was to empower students to explore spaces which they might otherwise avoid (Aguilar et al 45).

Central to this was re-framing of participation as "engagement". Rather than a static process of collecting points for showing up, the participation grade in the course was framed as an active, dynamic and ongoing process. Beyond attending class, students could raise their engagement score through opening topics of conversation, integrating their own research into their reflections, and asking questions which clarify course material.

Ideally, this approach rewards students who are willing to proactively engage with the classroom environment, while providing routes for students who might be more anxious about speaking out to comfortable engage with

the instructor or peers. Students have the ability to work with the instructor to customize what engagement with the course means to them, and in doing so take ownership of their classroom experience.

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302c – You all have the plague: Gamification design and practice*

*This is a University of Waterloo Learning Innovation and Teaching Enhancement (LITE) Grant-funded project

Jolanta Komornicka, St. Jerome's University

Andrew Moore, History

Kyle Scholz, Centre for Teaching Excellence

In this presentation, we will share the design, implementation, and research results of a gamified course, first offered in the Fall 2018 term as part of a grant. Incorporating a game-based course design framework, whereby the entire course was conceptualized as a game, we sought to determine to what extent student engagement is impacted by game design features embedded into a course. These features include elements such as collaborative team-based learning, problem solving, an interwoven narrative throughout the course, and the accumulation of points for accomplishing team-based and individual tasks (see Kiili, 2005; Sheldon, 2011; Charles et al., 2011, for examples).

The presentation will be delivered in three parts. First, we will provide an overview of the gamified course, both in terms of design and how it manifested on a daily basis in class. Second, we will analyze the students' responses to the various gamification elements embedded in the course. Students were asked to discuss their experiences throughout the gamified course, discussing levels of engagement and teamwork dynamics that emerged over time. Responses were gathered through qualitative research measures, including pre- and post-questionnaires, as well as focus groups held midway through and at the end of the term. The final part of the research talk concerns the feasibility of gamification for courses in other disciplines, especially with regard to scalability. The presentation is an opportunity to assess and share that data in a public forum and put it in conversation with the underlying

theory and methodology of gamified course design. Our goal is to simultaneously inform other instructors about the nature of gamified courses (from both the instructor and student perspectives) and to supply a forum for those interested in adopting the practice to ask questions and gain ideas about how to make gamification work in their own classrooms.

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Session 303 – Presentations

303a – Teaching teamwork skills and building effective teams using Educational Escape Rooms

John Kelly, Western University

Nicole Campbell, Western University

In this session, participants will consider how to "intrinsically motivate" (Bieg, Reindl, and Dresel 667) students Teamwork involves a diverse set of skills used by a group of people working together towards a common goal and it is an important skill set for many careers; however, undergraduate students report that opportunities to develop teamwork skills are limited. Additionally, it can be challenging for instructors to know the most important criteria that should be considered to build effective teams of students who can work well with diverse team members.

In response, we collaborated with an escape room design team to develop an educational escape room activity, which would act as a low-stakes team-based activity to provide students with an opportunity to practice and develop teamwork skills. Briefly, the activity requires teams of students to utilize their diverse strengths to solve a series of challenges and "break-in" to the box. It consists of various abstract challenges such as visual and numerical puzzles, which are based on relevant course content. Hints are provided as needed to maintain team progress. The activity's inherent teamwork lessons are subsequently debriefed as a class.

The activity was implemented into an undergraduate laboratory course where students are expected to work in small teams on a research project throughout the term. Following the activity, students completed self-efficacy surveys that assessed team behaviours and the results were used to inform diverse team selection.

The escape activity, which can be designed for any discipline, could serve as an innovative tool to address the lack of opportunities for teamwork development in the undergraduate curriculum and the selection of diverse and effective teams. The objective of this session is to share how the escape activity was used and the lessons we learned about teamwork based on their diversity of skills.

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303b – Active learning spaces encourage diversity in both teaching and learning styles

Katelyn Mottola Marchiori, Western University

Sarah McLean, Western University

Gone are the days of the rigid, auditorium-style classroom in Canadian universities. More and more institutions are beginning to invest in active learning spaces. These learning spaces often include moveable furniture, numerous writing spaces, which creates a more interactive learning environment for students. They may range in size and set-up, but one key feature that these spaces share is a rich opportunity for student collaboration. One such space is the Western Active Learning Space (WALS) at Western University. The WALS offers a unique experience for both instructors and students. The room is set-up with 7 D-shaped fixed tables and movable chairs; creating a "student-centered" learning environment. With the development of more active learning spaces occurring in higher education, it is worthwhile to examine practices that can help and/or hinder participation in this new educational environment. During this session, participants will learn about simple teaching strategies that can be implemented during the first day of class and throughout the semester to facilitate constructive and respectful discussions, develop a culture of collegiality, and allow students who are less inclined to participate an opportunity to contribute. The presentation will conclude with the discussion of an in-progress research project that will evaluate the capacity of active learning spaces to facilitate student development of transferable skills such as effective communication.

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303c – Fitting a square peg into a round hole: Physical space planning considerations for the implementation of experiential learning at the University of Waterloo

Dan Murray, School of Environment, Enterprise and Development (SEED)

Michael Wood, School of Environment, Enterprise and Development (SEED)

Jennifer Lynes, School of Environment, Enterprise and Development (SEED)

Experiential learning is perhaps most easily described as learning through doing (see Kolb, 1984). It is recognized as an educational approach that encourages critical thinking, student ownership of knowledge and the education process, leadership, and cross disciplinary connections. At present, there is a significant push to integrate experiential learning into higher education as a way to better train students, drive innovation and prepare the future workforce for technological change (see Government of Ontario, 2016).

The University of Waterloo (UW), in many ways, is leading the way. There is a rich history, strong support, and an existing framework for experiential learning at UW. Moving forward, the UW Strategic Plan explicitly calls for greater integration of experiential learning into course design (University of Waterloo, N.D). However, this integration does not come without challenges.

At its heart, experiential learning upends the traditional instructor-to-student knowledge transfer model typified by lecture-based course design. By upending the traditional course design, experiential learning also challenges the physical spaces within institutions in which learning takes place, raising the question: What physical space

design best facilitates the learning objectives associated with experiential learning? Overwhelmingly, the answer is: not lecture theatres. Developing flexible and active learning spaces where students can work in teams and engage in a more dynamic way with each other and with course instructors has emerged as best practice (Freeman, et. al. 2014; Talbert & Mor-Avi, 2018).

How does a university such as UW adapt over time to accommodate changing space needs so that student experience matches up with the objectives of teaching approaches like experiential learning? This presentation examines the design elements of physical teaching spaces that best support experiential learning. Additionally, it highlights the opportunities and barriers to accessing the types of spaces that best facilitate experiential learning at UW

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Session 304 – Presentations

304a – Embracing student diversity with differentiated assessments

Marie Lippens, Centre for Extended Learning

Melanie Misanchuk, Centre for Extended Learning

Dewey (1969) describes the "ultimate challenge in designing an educational experience" as both personally meaningful and socially worthwhile. It stands to reason that a diversity of students requires a diversity of assessment possibilities in order to achieve this. We suggest that differentiated assessment structures can be used to foster individual development in this area.

Students inevitably enter their programs with not only vastly different backgrounds and life experiences, but also very different perceptions of competence, self-esteem, motivation and locus of control (Fazey and Fazey, 2001).

Whereas there is much discussion of creating learning material that is accessible and appropriate for diverse learners (Axelrod, 2018; Al-Azawei, Serenelli, & Lundqvist, (2016)), there is less attention paid to providing students with a variety of ways to demonstrate their learning, through differentiated assessment.

This presentation will discuss a number of different assessment structures. Depending on the readiness of the students and the instructor, this could be:

- simply different weightings of similar assignments,
- offering students a variety of options (e.g., a number of low-stakes assignments versus a few high-weight tests), or
- encouraging students to formulate their own assessments toward their own experiential
- learning goals (i.e., let students create/solve/present something they want to create/solve/present).

Come share your experiences - positive and negative - with different assignments and learn some strategies to implement these novel assessment structures.

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304b – Implementation of self-selected grade weighting in a second year Kinesiology course

Chris Vigna, Chemistry

Laura Williams, Kinesiology

Previous research suggests that providing students a variety of assessment methods and grade weighting is good pedagogical practice, as it supports different learning styles, leads to a sense of control and may reduce stress(1-3). In an effort to address the diverse needs of our undergraduate students, we provided students with optional grade weighting possibilities for the Spring 2018 offering a Kinesiology course, namely, KIN 232 Research Design and Statistics. This course included lecture and lab components. Students were given four grade weighting options: Standard, Lab Heavy, Midterm Heavy or Final Heavy. The self-selected grade weighting was implemented to meet the diversity of students in two ways: 1) it enabled students to compare the workload and assessment due dates across their course-load to help reduce an overly stressful midterm/assignment week, and 2) as second year students, they are more aware of where their strengths lie with respect to demonstrating their knowledge of material. We found that 14 students actively chose Standard, 66 chose Lab Heavy, 11 chose Midterm Heavy, none chose Final Heavy, and 57 made no choice, thus defaulting into the Standard Weighting condition. The majority of students chose the weighting scheme that provided them a better weighting than another condition. Interestingly, while one of the aims of this venture was to lessen student stress, we unintentionally increased stress as students were afraid of choosing an option that would be result in a lower overall grade(3). Student feedback revealed that while they did like the idea of a self-selected grade weighting, they would have preferred more information on the lab assessments prior to making their decision. The goal of this session will be to illustrate this grading technique and to contrast the current approach with those previously used in the literature.

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304c – Sequential writing assignments to critically evaluate scientific journal articles

Suzanne Wood, University of Toronto

In the later years of undergraduate study, we ask our students to read and evaluate primary literature within our fields. Shifting from textbooks - sources of packaged, contextualized knowledge - to vast amounts of peer-reviewed, yet otherwise unfiltered literature can be a tough transition for our students. Can they be taught to thoughtfully identify what findings are important and what will be rarely discussed again? How can we enhance our diverse learners' critical thinking skills that, while practiced in the classroom, will translate to critical evaluation of ideas outside of the classroom? The assignments detailed in this presentation will help support instructors in creating and implementing assessments of learning that tap into a range of student abilities, from describing ideas to critically evaluating them. Our learners enter our courses with a diverse range of background experiences, in terms of writing and critical thinking skills, as well as disciplinary knowledge. It is the hope that the sequential nature of these assignments will lend themselves to be accessible to and challenge this diversity of students.

Several useful methods have been developed to guide students through reading scientific journal articles (e.g., Bodnar et al., 2016; Brownell, Price, & Steinman, 2013; Round & Campbell, 2013). This presentation will detail an innovative approach to helping students achieve a deeper understanding of primary literature, involving a series of sequential assignments based upon the levels of increasing cognitive complexity in Bloom's taxonomy (Anderson & Krathwohl, 2001).

Participants will leave the session with a description of the assignments used in an example class, as well as initial plans for implementing these assignments into their own classes. While this session will use scientific literature as a model, the assignments generated could be translated into other fields in which students struggle with interpreting and critiquing primary literature.

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Session 305 – Presentations

305a – Closed-loop problem based learning as a method to meet the needs of diverse learners

Heidi Fernandes, School of Pharmacy

Jeff Nagge, School of Pharmacy

This session will introduce participants to an active learning method called Problem-Based Learning (PBL), which uses open-ended cases as a stimulus for learning. PBL was first used in professional schools at Harvard University. In this session, we will focus on Closed-Loop Problem-Based Learning (CL-PBL), the type of PBL pioneered by the School of Medicine at McMaster University. We will review the pedagogy of CL-PBL and highlight research investigating the effectiveness of the method. The required components for PBL will be outlined, and tips for incorporating CL-PBL into the curriculum will be shared. The session will end with reflections on CL-PBL from instructors and students at the University of Waterloo School of Pharmacy (UWSOP). The session will be led by the current CL-PBL course instructor from UWSOP and a former student who is now a PBL tutor.

Learning Objectives:

1. Describe the pedagogical role of CL-PBL in education, including the development of lifelong learning skills.
2. List the essential components of a CL-PBL course
3. Explain the role and training requirements of the CL-PBL tutor
4. Outline how the CL-PBL tutorial structure recognizes student diversity by respecting individual learning goals and styles, and encouraging perspectives from students with varied experiences and backgrounds

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305b – Empowering students in the classroom to raise the bar for practical patient self-care in the community: A pilot project at the School of Pharmacy

Nardine Nakhla, School of Pharmacy

Paul Malik, School of Pharmacy

Background: Translating didactic content from the classroom into the "real world" can challenging. Here we showcase an infographic assignment that puts course content into action with innovations from students in the classroom.

Intervention: In the "Spotlight on Self-Care" assignment, each student was assigned one minor ailment that would typically be treated from the self-selection area of the pharmacy, such as constipation or headache. Each student created a two-page magazine infographic to guide pharmacists in innovative, evidence-based and financially sustainable ways of providing medical care on that topic. A special emphasis was placed on practicality, raising the bar on current practice standards and integrating the students' proposals into the general pharmacy workflow.

Result: The diverse spectrum of assignments submitted – diverse not only in appearance but also in ideas and workflows – spoke volumes to how each learner in the classroom took unique ownership over their topic and expressed how they personally envisioned the future of pharmacy practice. The top 5 assignments are set to be published in upcoming issues of the Pharmacy Practice and Business magazine. Following completion, many of the practice tools were collated into one document covering therapies for over 20 ailments and distributed to all students for future practice use.

Conclusion: The opportunity to impact real-world practice from the classroom inspired innovation and a sense of belonging among students. Infographic assignments help to recognize the diverse learning and communication styles of students in the classroom, giving them multiple ways to demonstrate what they know.

305c – Use of assessment of prior learning in a PharmD bridging program

Rosemary Killeen, School of Pharmacy

Stacey Verhaeghe, School of Pharmacy

Debbie Ellen, School of Pharmacy

As the twenty-first century brings more learners with previous and diverse experience to university programs, recognition of prior learning (RPL) may be a mechanism to meet the evolving needs of students and instructors and avoid duplication of learning. RPL allows students to gain academic credit after demonstrating competence, skill or achievement of specified learning outcomes.

Since its launch in January 2015, the University of Waterloo School of Pharmacy has admitted 244 alumni as mature students to its PharmD Bridging program. Based on the Canadian guidelines1 and best practices in other jurisdictions2, a rigorous RPL process was developed to capture students' clinical competence [3].

We will address the reasons for our design choice of three assessment methods: Electronic portfolio, case submissions and oral presentations and how students respond to each. Each of the selected assessment types allows for concurrent evaluation of multiple competencies and is adaptable to the wide variety of practice settings represented by our students. As well, we will discuss the tools and templates developed to facilitate our processes, our standards for inter-rater reliability and steps taken to mitigate student stress in a high stakes course - practices applicable across disciplines.

To date, 164 students have completed the RPL process, utilizing 93 external assessors. A mixed-methods study is now underway to gather feedback from students, assessors and other stakeholders and measure the satisfaction of all groups. Preliminary results, including student outcomes, will be presented.

We will encourage participants to consider how to apply RPL elements in their courses and programs.

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Session 306 – Alternative Session – Coming full circle – Expectations, experiences and impacts of Niagara College's Indigenous learning circle

Dana Wetherell, Niagara College

Apryl Gill, Niagara College

Natasha Hanno, Niagara College

Elaine Berwald, Niagara College

Crystal Adams Coons, Niagara College

Rachel Cloud, Niagara College

Background:

In 2015, the Truth and Reconciliation Commission of Canada (TRC) outlined calls to action for reconciliation between Canadians and Indigenous peoples. The proposed actions call on all levels of government "to raise awareness of Indigenous peoples, cultures, histories, and intellectual traditions in non-Indigenous learners as well as to create meaningful and accessible learning opportunities for Indigenous learners." (Morcom, Lindsay & Freeman, Kate)

In January 2018 Indigenous Education and the Centre for Academic Excellence at Niagara College (NC) hosted the inaugural Indigenous Learning Circle (ILC). The circle implies an equality of participation and is common in traditional Aboriginal approaches. (McBride, John & Good, Julia) For the NC ILC, a safe space was created by the Elder, allowing for open dialogue and sharing of experiences.

Comprising 13 NC educators the circle met monthly over four months to explore issues and opportunities shaping the experiences of Indigenous students at the College. With new knowledge and understanding, circle members engaged with Indigenous perspectives and reflected on their role at the College.

Description:

This session will explore the expectations and experiences of, and impacts to, individuals engaged in the ILC from three different perspectives:

1. The Indigenous Elder who facilitated the circle
2. An Instructor who participated in the circle
3. The Organizers who helped to organize and participated in the circle

A fourth perspective will be shared by a Student who will share her experience of an outcome of the circle in terms of a transformative class assignment.

Objectives:

Through participation in this session, participants will:

1. Engage with ILC stakeholders in terms of their expectations, experiences and impacts of the circle.
2. Relate learnings from the ILC to their own understanding of Indigenous Ways of Knowing.
3. Explore learnings they might adopt for their own classes and/or interactions with Indigenous students.

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Session 400s: 4:10 – 5:10 p.m.

Session 401 – Workshop – Exploring Waterloo's teaching culture: What instructors, staff, and students don't know

Kristin M. Brown, Centre for Teaching Excellence

Donna E. Ellis, Centre for Teaching Excellence

Ken N. Meadows, Western University

Various indicators suggest that we need to put more emphasis on using inclusive teaching practices at Waterloo (e.g., provincial accessibility requirements, increased focus on student mental health, Waterloo Undergraduate Learning Strategic Plan Issue Paper). However, to help develop an inclusive teaching culture at Waterloo, we can benefit from first understanding the current state of our culture, including the gaps in community members' knowledge of that culture. Institutional teaching culture comprises embedded behaviours, values, and beliefs, which help to create and explain instructor and learner experiences (Kezar & Eckel, 2002). In Fall 2016, we piloted a set of surveys to investigate how University of Waterloo undergraduate and graduate students, instructors, and staff perceive Waterloo's institutional teaching culture. This project was part of a SSHRC-funded study conducted by a research team from nine Canadian universities (Kustra et al., 2015).

In this workshop, we invite participants to review and reflect on the Waterloo results to explore what our instructors, staff, and students reported they don't know about elements that reflect an institution's teaching culture. By examining the survey results in small groups and reflecting in large group discussion, we will explore issues such as: where the gaps in knowledge about the teaching culture exist; why these gaps might exist and what they tell us about teaching and learning at Waterloo; and, which gaps, if any, are particularly problematic?

We will also consider the specific case of making a shift to employing inclusive teaching practices: how might the gaps identified from this research into our institutional teaching culture enable or impede changes in practice? We look forward to a fruitful discussion.

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Session 402 – Panel – Helping the medicine go down: Teaching across C.P. Snow's two cultures

Scott Campbell, Centre for Society, Technology and Values

Doreen Fraser, Philosophy

Maura R. Grossman, Computer Sciences

Paul Heidebrecht, Conrad Grebel University College

How does an instructor appeal to computer science and law students in a course about artificial intelligence and ethics? Prepare to teach the history and philosophy of physics to students from five faculties? Create an environment in which engineering students learn about the impact of technology from classmates in other disciplines? Strike a balance between condemnation and affirmation when presenting future innovators and entrepreneurs with destructive as well as constructive applications of their disciplines?

In this panel, instructors from four distinct programs across three University of Waterloo faculties will discuss the challenges and benefits of teaching a diverse group of learners, based on their experiences teaching the following courses:

- CS798: AI: Law, Ethics and Policy (Grossman)

- PACS315: Engineering and Peace (Heidebrecht)

- PHIL252: Quantum Mechanics for Everyone (Fraser)

- STV100 Society, Technology and Values: An Introduction (Campbell)

As C.P. Snow observed almost 70 years ago, a persistent, unbridgeable divide between the culture of engineering and sciences and the culture of the humanities would leave the world unable to solve its most pressing problems. Yet finding fertile common ground can seem impossible when each side feels superior or fails to see value in the other's perspective. Despite the known benefits of interdisciplinarity and diversity in solving complex problems, students (and even faculty!) may shy away from confrontation between the two cultures.

Our panel will describe the honey we use to help the medicine go down, including practical teaching concerns, unique disciplinary challenges, and broader pedagogical issues. Multimedia, simulations, and public lectures can all help to reach a diverse group. Cross-disciplinary activities encourage the development of common new skills and create trust in the classroom community. And because success sometimes requires that we break the preconceived notions of faculty and administrators, not all the lessons take place in the classroom.

Session 403 – Presentations

403a – Fall break intervention: Turkey, studying, and avoiding the side of regret

Mary Robinson, First-Year Engineering Office

Chris Rennick, Mechanical and Mechatronics Engineering

Carol Hulls, Mechanical and Mechatronics Engineering

Samar Mohamed, Centre for Teaching Excellence

Fall breaks have become the reality for Ontario universities, though they can have negative side effects for specific at-risk communities of students [1, 2, 3]. To mitigate the perceived harmful effects of the break, an academic and social intervention ran during the fall break in 2018. While designing this intervention, multiple at-risk populations

were targeted: first-year students, students who could not return home (international or out of province students), students with few social connections at Waterloo, struggling students, and others.

During the two-day intervention, instructors and T.A.s held one-hour course-specific sessions, advertised as midterm help sessions, in a variety of formats. The goals of these sessions were to review the relevant course content and problem-solving techniques while modelling study strategies and reminding students of campus services and supports. Social events, run by a student society, were interspersed with the academic sessions; these sessions were designed to help students build a network of peers and become more familiar with the non-academic supports available on campus.

To assess the impact, two methods were used:

1. three surveys were run during the fall term, which included a validated survey instrument to measure self-reported student stress [4]; and
2. focus groups were conducted with students in the subsequent winter term.

Analysis of the data is ongoing, but preliminary results show that without the intervention structure, a significant portion of first-year students do not use the unstructured time of the fall break optimally.

During this session, we will describe the intervention that ran in October 2018 and share the results from the surveys and focus groups. The authors hope that this model could be adapted and used in other programs on campus to support student success.

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403b – Creating a learning environment that is firm but fair: Maintaining academic rigor while prioritizing student mental health

Nicole Campbell, Western University

Stephanie Zukowski, Western University

Student mental health has become a priority for many institutions because of the rise in students seeking support services on campuses. Anxiety, stress, and depression are examples of common mental health problems for university students. There are many ideas about why there is a mental health crisis amongst these young adults, including pressure to succeed, transition in expectations, and information overload. Although it is not a simple solution, we believe that there are ways by which instructors can design and operate their courses to prioritize mental health. Some educators question the ability to balance being caring or compassionate to students while maintaining academic rigor and high expectations. In this pilot project, we aim to identify practical ways curriculum designers and instructors can be proactive to promote good mental health for their learners. It is our opinion that when learners are well, they are more likely to engage meaningfully and achieve deeper learning. Some examples that we will address are flexible assessments, multiple attempts at new tasks, scaffolding, and peer review. We will also discuss how we create a supportive learning environment where students and

instructors build professional relationships based on trust and respect. The pilot project occurred in fourth-year mandatory capstone courses for interdisciplinary medical science students at Wester University; however, the information presented can be applied to any discipline or academic level. The objective of this session is to share the mental health curriculum inventory and focus group results of our pilot project and engage the audience in a discussion about future initiatives.

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Session 404 – Presentations

404a – Many disciplines, one goal: Inclusive teaching in a culturally diverse community

Constance Leonard, United States Air Force Academy

Shernette Dunn-Savery, United States Air Force Academy

Equity in education gives students the necessary tools they need to become successful learners. As the student population in North America becomes more diverse, it is crucial that educators are aware of the needs of their student population to ensure that each student is treated equitably and included as a valued member of their learning environment. This presents various challenges at the United States Air Force Academy (USAFA) as it is a military institution that highlights formality and unification but also has an increasingly diverse student body and a faculty pool that consists of both civilians and military officers. Two professors from USAFA and its Preparatory School will offer pedagogical approaches applicable to all disciplines driven by institutional outcomes with an emphasis on equity rather than equality. These outcomes include: The Human Condition, Cultures, and Societies – to comprehend what it means to be human, the individual situated in a culture and society, and the interactions of people from different sociocultural milieus as well as Ethics and Respect for Human Dignity – to recognize ethical alternatives among the options available, use ethical judgment to select the best alternative, and act consistently to respect the dignity of all affected persons. Difficulties sometimes arise when both the instructor and the student do not possess the skills needed to address or respond to sensitive topics and situations. By examining authentic scenarios collected in different disciplines, such as Chemistry, English, History, and Math participants will have the opportunity to propose solutions and learn strategies to effectively mitigate misunderstandings and microaggressions in the classroom. These scenarios are an outcome of the Making Excellence Inclusive Committee (MEIC) to address perceived microaggressions reported by students and faculty and they present an opportunity for instructors to improve their classroom practices as they instruct a diverse student body and for students to become aware of their own personal biases. Participants will then have the opportunity to share their own challenges and leave the session with new tools to prepare linguistically, academically, and socioeconomically diverse learners to become successful contributing members of society.

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404b – Spreading attention in the classroom: Student learning as a function of attentive and inattentive others

Alex C. Huynh, Psychology

Noah D. Forrin, Psychology

Alyssa C. Smith, Psychology

Daev McLean, Psychology

James Siklos-Whillans, Psychology

Daniel Smilek, Psychology

Colin M. MacLeod, Psychology

In a lecture setting, students' expressions of attentiveness are positively tied to several effective learning strategies (completeness in note-taking; Armbruster, 2000; retention of information; Scerbo et al., 1992). Despite evidence of the importance of student attentiveness in learning, well-controlled laboratory evidence for the relation between attentiveness and learning is lacking (Wilson & Korn, 2007). The research presented here aims to close this gap in knowledge, providing experimental investigation into how attention may spread in a classroom and influence learning performance. The study we present draws on psychological theories arguing that the experience and behaviour of others around us can act as a source of contagion, contributing to similar experiences and behaviour (e.g., Parkinson & Simons, 2009). In the present study, 247 University of Waterloo undergraduate students were brought into the lab to watch a lecture in the presence of a fellow undergraduate (a confederate research assistant) trained to behave in one of three experimental conditions—attentively (e.g., sitting upright, taking extensive notes on the lecture); inattentively (e.g., doodling, leaning back), or out-of-sight (i.e., behind in the room, not in view). Results indicated that students in the presence of an attentive-other (vs. inattentive-other) performed marginally better on a post-lecture multiple choice content test. Additionally, the more attentive students rated the confederate research assistant to be, the less often they reported mind wandering themselves. Attention ratings of the confederate research assistant was also marginally positively associated with greater performance on the post-lecture test. These findings suggest that the level of attentiveness of others around students can have a meaningful influence over students' attention and success in learning lecture material. Implications of these findings will be discussed, offering insight into how to adjust teaching practices to positively influence students' attention levels and to reduce barriers to student learning.

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Session 405 – Presentations

405a – Creating an inclusive culture in first year engineering students

David Wang, Electrical and Computer Engineering

University of Waterloo's department of Electrical and Computer Engineering has approximately 400 students enrolled in first year. Not unlike most undergraduate programs [1], there is a high rate of student attrition. As the students come from very diverse backgrounds with different learning styles, it is believed that creating a more inclusive culture for them through interdependent group work will lead to greater student success. Increased student success is the expected learning outcome. For this preliminary study, Kirpatrick's model is be used to evaluate our preliminary findings [2].

All first year ECE students take a newly modified course entitled "Engineering Profession and Practice." This course was redesigned to create a greater sense of community and inclusivity amongst students. To begin, they were put randomly into groups of 3 for team activities and discussions. As an extrinsic motivation to create interdependence [3] between group members, each member received a 10% bonus should their final course average rise from their midterm average or if the final course average of the group members was over 70 with no student failing the term. Sessions focused on teaching students how to learn were also provided [4], with a focus on group work. Finally, there were competitive team activities which required not only engineering design but also group communication skills to complete.

Level 1 Kirkpatrick assessment was accomplished though student surveys as they progressed through the course. Some Level 2 and Level 3 findings will also be presented based on their academic performance by the end of the term. These results appear to indicate that the students found the groups beneficial to their learning and that they felt more comfortable with social networking.

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405b – Closing the collaborative skills gap: Assessing the effectiveness of a university-wide course designed to teach students how to collaborate in diverse groups*

*This is a University of Waterloo Learning Innovation and Teaching Enhancement (LITE) Grant-funded project

Kathryn Plaisance, Knowledge Integration

Christopher Lok, Psychology

Christine Logel, Renison University College

Being able to work well with others is an important and useful skill for any student. The benefits of collaboration are well documented: collaborative teams tend to generate more creative ideas, outperform individuals, and produce better work (Laughlin, 2006). What's more, interdisciplinary collaboration is often required to address complex problems such as climate change and global poverty (Denning, 2009). Employers frequently list teamwork as one of the most important skills desired in new graduate: in a recent survey by the National Association of

Colleges and Employers, the "ability to work well on a team" was tied for the #1 skill employers look for when recruiting recent graduates (NACE 2017).

However, many undergraduate students aren't explicitly taught how to collaborate effectively. According to a small survey conducted as part of the lead author's previous LITE grant, only 33% of students affirmed that they had been taught how to collaborate in their courses. Yet, 81% agreed with the statement, "I wish I had been taught more about good collaboration or teamwork in the classroom."

To address this "collaborative skills gap," the lead author worked with undergraduate students to design a university-wide course that would teach students theories and best practices for effective teamwork, and give them the opportunity to work in diverse groups. The course was offered in Fall 2018, and drew students from all six faculties.

To study the impact of the course with respect to students' attitudes around group work and their collaborative capabilities, we conducted entrance and exit surveys for all students who took the course. We also asked students to write a series of reflections about their collaborative experiences.

In this talk, we provide an overview of the course and share the results of our survey, as well as some of the findings from the students' reflections.

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405c – Reflections from planning and executing a pilot project designing pedagogical activities for students across borders

Ekaterina McKnight, School of Public Health and Health Systems

Elena Neiterman, School of Public Health and Health Systems

Karla Boluk, Recreation and Leisure Studies

Raushan Alibekova, Nazarbayev University

The goal of this paper is to summarize the experiences of three Faculty members and one research assistant in developing pedagogical alignment with two courses taught across borders. The project reflects the integration of a third-year Community Engagement undergraduate course taught at the University of Waterloo and a first- and second-year course in the Master of Public Health program at Nazarbayev University, Kazakhstan. Establishing a new partnership in collaboration with colleagues from Nazarbayev University, we initially determined courses ripe for alignment and identified some points of intersection. Our goal was to provide students with an opportunity to learn about the topics by engaging in online discussions with a diverse group of students from both sites. In this presentation, we share our experiences of establishing a new partnership, co-developing activities, and reflecting on some of the challenges we experienced while piloting this project. We aim to (a) describe the process of aligning these two courses; (b) identify some challenges experienced during this process; and (c) present and receive audience's feedback on the how-to guide that we developed during this project.

We outline some lessons learned from our experiences and provide the audience with how-to guide for developing alignment between two courses. In conclusion of our presentation, we will ask the audience to provide

feedback on our how-to guide and assess its compatibility with their courses/disciplines. This presentation clearly fits with this year's conference theme of teaching and designing for diverse learners, as we considered course alignment for international audiences of students and instructors.

Poster Session: 5:10 - 6:00 p.m.

501 – The art of anatomy: Body painting as a tool for teaching and learning

Cindy Wei, Kinesiology

Tamara Maciel, Kinesiology

Human anatomy is traditionally taught using textbooks, atlases, plastic models, and pre-dissected specimens. Cadaveric structures, however, are monochrome due to preservation. Body painting aids students in learning anatomy by bringing structures to life while helping students appreciate human movement and sensations. Students may be emotionally-distant from patients' bodies, causing "desensitization" and objectification; body painting enables students to understand spatial relations of tissues on a living human (Finn, 2009). Not only do vibrant colours promote memory, but students better visualize structures as they palpate. Drawing is an effective encoding tool that enhances memory performance in adults of all ages (Meade, Wammes, & Fernandes, 2018). Further, body painting was efficient in terms of time and learning (Op den Akker et al., 2002). Body painting may reduce barriers to student learning, as students who cannot afford a plastic skeleton may consider purchasing a $20 body paint set for home practice. Body painting is a fun and inclusive activity that fosters peer-peer relationships, allowing both the painter and the model to learn (Op den Akker et al., 2002). Body painting bridges the gap between science and art, potentially encouraging science students to explore artistic endeavors, and will be relevant to people with diverse educational backgrounds. Specifically, anatomical knowledge is important in disciplines such as biology, biomedical engineering, pharmacy, optometry, and fine arts.

I am a KIN472 student creating a PDF of step-by-step instructions for painting anatomical structures on a live model. This anatomical guide to body painting is based on the KIN100 curriculum, and will cover twelve to fifteen important body regions, such as spinal regions and hand bones. In addition to the guide, I will establish a colourful, informative poster to share this unique and beneficial approach to anatomy. I will be present at the poster session to interact with participants.

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502 – The science library project: (Re)designing for diverse learners to promote and sustain inclusivity in non-major STEM courses

Sarah Ruffell, University of Pittsburgh at Bradford

Tommy Mayberry, University of Guelph

The Science Library Project at the University of Pittsburgh has students create children's books about key course content in their non-major STEM courses as a high-impact practice (HIP) assessment that emphasizes the importance of public outreach and science communication and that fosters in students a greater understanding and retention of the scientific content within their courses. This year, in the effort to incorporate and model inclusivity in the classroom and curriculum (which is increasingly becoming institutional requirements of higher education North America), bonus marks were awarded to groups who consciously and metacognitively incorporated inclusive elements and design into their book projects – such as diverse characters (BIPOC, trans-/non-binary, differently-abled, etc.) and/or intercultural scenarios. At the beginning of the term, students were introduced to inclusivity and diversity through class discussions, peer-reviewed articles, and inclusively diverse children's books – such as Peter Parnell, Justin Richardson, and Henry Cole's And Tango Makes Three (2005) and Lisa Mantchev and Taeeun Yoo's Strictly No Elephants (2015). At the end of the term, students were surveyed regarding their understanding of inclusivity and the need for inclusivity within and beyond the classroom, and the survey results demonstrated an increased understanding of the concepts and techniques that are used to communicate inclusively. This re-design for diversity to The Science Library Project builds on Malatino (2015), who highlights the dangers of tokenism as "evidence of inclusivity" in the classroom (400) and who pushes "attitudes[s] of benevolent empathy" most common in incorporating inclusivity and diversity into the classroom and curriculum toward a decided engagement of inclusivity and diversity in "critical self-reflexive process[es]" (400-1). The minor modification of incentivized metacognitive reflection and conscious and creative engagement has important and powerful implications for moving toward inclusive classroom dynamics as well as inclusive curriculum in post-secondary institutions and degrees.

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503 – Priors and posteriors: Teaching Bayesian reasoning to learners varying in knowledge of probability

Yichu Zhou, Psychology

Colin MacLeod, Psychology

How does prior knowledge influence determination of an effective strategy for teaching basic Bayesian reasoning? We began by assessing participants' knowledge of high-school-level probability, and used the results as a proxy for prior knowledge. An instructor then led the participants through a series of Bayesian reasoning problems using one of two randomly assigned teaching strategies. One group was taught to solve the problems using frequency trees as a visual aid; another group was taught to solve the same problems using the Bayesian formula. Current findings reveal that participants performed better overall on a subsequent test when taught with the frequency tree method, despite best efforts to clearly state the relation structure among the elements presented in these problems under both teaching strategies. Although this benefit was seen in both the high-knowledge and low-knowledge participants, the improvement was significantly greater for participants with lower prior knowledge. According to the cognitive load theory, learners with low prior knowledge require greater guidance during learning to offset high cognitive load whereas learners with high prior knowledge have greater capacity for automatic processing. Participants with low prior knowledge benefitted much more when exposed to frequency trees whereas participants with high prior knowledge generally learned comparably well with the two methods. Clearly, prior knowledge can interact with the effectiveness of a teaching strategy and should be taken into account in developing teaching techniques in a wide variety of domains.

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504 – Identifying training needs and approaches for student team effectiveness in on-campus teams

*This is a University of Waterloo Learning Innovation and Teaching Enhancement (LITE) Grant-funded project

Roxy Merkland, Psychology

John Michela, Psychology

Although teamwork is widely promoted in support of deep student learning, students' gaps in knowledge, skills, and attitudes (KSAs) for effective teamwork can impede learning (Bacon, 2005). We conducted a training needs analysis (Morrison et al., 2012) to specify KSA gaps for undergraduate teamwork. Thus, the first objective for our poster is to inform university educators about KSA gaps that should be addressed in training or other guidance to students on the topic of teamwork effectiveness. Such guidance has been shown to improve teamwork performance (Pritchard et al., 2006; Salas et al., 2008).

Forty-five undergraduate students and 12 faculty and staff instructors were interviewed from various faculties at the University of Waterloo (UW). Interview data were transcribed and coded using NVivo software. In their interviews, instructors described aims, processes, and outcomes of undergraduate teamwork in their courses. Instructors identified five primary teamwork shortcomings, involving: interpersonal relations, commitment, leadership, group time management, and self-management of group members. Undergraduate students identified mostly the same teamwork shortcomings as instructors had, although not in the same priority order: commitment, communication, self-management of group members, group time management, and leadership.

A further objective for our poster is to provide instructors with a generic model for developing team performance supports which adopts "design thinking." In the ADDIE model of instructional design (Gagné et al., 2005), A is analysis, D, design, D, development, I, implementation, and E, evaluation. The present findings will be most useful if treated as input to the "Analysis" stage of the ADDIE development process. The remaining four stages should be undertaken systematically by course instructors according to their circumstances. As illustration, an instance of past use of this model will be outlined, in which teamwork shortcomings uncovered in a needs analysis were used to select teamwork training content that aligned with identified needs.

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505 – Multi-modal teaching & learning – An engineering experience*

*This is a University of Waterloo Learning Innovation and Teaching Enhancement (LITE) Grant-funded project

Rania Al-Hammoud, Civil and Environmental Engineering

Samar Mohamed, Centre for Teaching Excellence

In this poster we share and reflect on our experience in using diversified teaching methods in junior engineering courses. While some of the methods proposed below are somewhat established in non-STEM fields, they can be considered innovative in engineering education where traditional lecturing is still dominant. The methods summarized are used for course delivery and assessment in an attempt to create a more inclusive environment that helped our students go smoothly through the learning process. The instructor used multiple methods that are geared towards the "Why", "What", and "How" of learning. Different means of material delivery and a wide variety of assessment and communication methods were used to engage a wide range of students [1]. For example, the instructor:

- provides learning outcomes for each lecture while highlight real life applications of the covered topics.
- provides pre-class music and games,
- offers a variety of teaching and learning options, allowing learners to follow their preferred learning path, such as discussions, hands-on activities, demonstrations, online videos and interactive flipped classroom modules,
- provides review materials in large print around the classroom,
- encourages multiple channels of communication which include in-class questions, group projects, office hours, online discussions and questions using Piazza,
- provides instant feedback using the online quizzes and during the hands on activities,
- creates frequent and flexible opportunities for students to demonstrate their knowledge,

Most of the used techniques can be applied or adopted in other disciplines. The feedback received from the students reflects their appreciation of the inclusive methods and will be shared in the presentation. Some of these methods were supported by three LITE grants. Some of this work was published in [2,3,4].

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