

Presidents' Colloquium

Marcy Slapcoff and Brad Wuetherick

“Bridging the Divide: Promoting Deep Learning by Integrating Research, Teaching, and Learning”

The importance of embedding research into the undergraduate experience is a high priority at institutions of higher learning worldwide, and has been identified in the literature as being one of the most high-impact educational practices in higher education (Boyer Commission, 1998; Brew, 2006; Kuh, 2008; Beckman & Hensel, 2009; Healey and Jenkins, 2009; Elrod, Husic & Kinzie, 2010). In order to achieve this objective, it is essential that we, as members of the higher education community, think beyond individual supervision—perhaps the most obvious way in which professors can link teaching and research—and promote ways of embedding research throughout our curricula across all disciplines to enhance students' understanding of how research contributes to knowledge production. In this plenary, we will ask the questions: What are the defining features of research in the context of undergraduate education? What is deep learning? How can faculty embed research in course experiences in ways that promote students' active engagement and deep learning? The presenters will draw on their own experience and research in the field of higher education, across three Canadian research universities, to respond to these questions and lead a brief discussion where participants can share their own points of view and learn from one another.



Marcy Slapcoff is an Educational Developer at McGill University's Teaching and Learning Services, where she leads a university-wide initiative to promote the links between teaching and research/scholarship. As the integration of research/scholarship into the undergraduate experience becomes a priority at an increasing number of institutions worldwide, Marcy promotes the idea that coursework can be used to help students develop a better understanding of how research and scholarship contribute to knowledge production.

Prior to coming to McGill, Marcy held a similar position at Concordia University and worked as an international human rights educator at Equitas (formerly known as the Canadian Human Rights Foundation). She has also worked as an instructional designer in the government and corporate sectors. In addition to the Teaching-Research Nexus Project at McGill, Marcy also develops and facilitates course design and teaching workshops for faculty members, and has collaborated with several new programs on the development of program-level goals and integrated courses. An additional area of professional interest is sustainability in higher education.



Brad Wuetherick joined the Gwenna Moss Centre for Teaching Effectiveness in January 2010 as the Program Director for the Centre after working and studying at the University of Alberta for a number of years (including more than four years as the Director of the U of A's Research Makes Sense for Students initiative dedicated to encouraging and supporting undergraduate research).

Brad's research interests focus primarily on experiential learning and the effective integration of research, teaching and learning, including several projects related to both student and faculty perceptions and experiences of research in the undergraduate learning environment. He has written several articles/book chapters on this area (see the academia.edu profile listed below for more information), and has been an invited plenary, symposium or workshop presenter at conferences and universities across Canada and internationally (Australia, England, Ireland, Scotland, and the United States).

He has also been involved in projects related to the development of graduate attributes (professional/generic skills, such as communication, leadership, research and inquiry, ethics, etc.), threshold concepts in higher education, the scholarship of teaching and learning (SOTL), community service-learning, aboriginal education and multiple ways of knowing, and teaching with technology (in particular computer assisted language learning and eportfolios). At the U of S, Brad currently co-teaches Transforming Teaching (a course for new faculty), the Instructional Skills for Graduate Students course (a course for graduate students with no prior teaching experience), and is part of the GSR 984 – Critical Thinking and Professional Skills for Graduate Students core team of instructors. He also serves as the Chair of the Saskatchewan Faculty Development Network, and the Chair of the Society for Teaching and Learning in Higher Education SOTL Committee (as well as the STLHE Board of Directors Representative for Saskatchewan and Manitoba).

Afternoon Plenary Panel

Live Teaching Showcase

"Igniting Our Practice"

For this session, we asked three University of Waterloo professors to invite us into their classrooms by teaching us something -- any concept from their disciplines -- using a method they typically use with undergraduates or that is particularly suited to that concept.

Teaching and learning aren't content-free. The space of the lecture hall (skeptics to the contrary) will not be going away anytime soon. How can we use that space effectively to help learners get excited about the implicit structures and explicit content of our disciplines? Is it possible to do this in low-tech ways? What's the difference between carefully orchestrated activity and planned-on-the-fly methods?

After each presenter takes us into his or her learning space, we'll have an opportunity to reflect on how we might adapt their methods to our own disciplinary purposes, if possible, and have time for a few questions to unpack why the professors taught us the way they did.



Serge D'Alessio, Mathematics

Associate Dean of the Faculty, Serge brings his background in Applied Math and Engineering Physics to life in the classroom as well as helping the profession through his involvement in the Grand Valley Mathematics Association, where he has given a workshop on the transition from high school to university for secondary teachers since 2007. In 2010, he was honoured with a Faculty of Mathematics Distinguished Teaching Award. His current research involves flows over uneven surfaces. He plans to use demonstrations to help illustrate the problems that he'll be discussing.



Shannon Dea, Arts

Shannon's involvement in teaching development not only for herself and her students but also as a leader among peers is unprecedented during the pre-tenure period of an academic career. Post-tenure, she's heading to China for a visiting professorship this summer. Her diverse research projects perhaps reflect the eclectic interests of her main object of study, 19th Century American polymath Charles Sanders Peirce, whom she writes about, surprisingly, in the context of Spinoza's thought. Teaching is a passion of hers as well, and as a LIF/PIF Grant holder, she studied the impact of transforming a library space into a Learning Commons for groups of students enrolled in Philosophy courses. Her time with us may include mittens.



Gord Stuble, Engineering

Gord's influence has been long-term and felt deeply in Mechanical and Mechatronics Engineering, then in WatPD Engineering, and also Faculty-wide as a mentor, a leader, and a catalyst for others' efforts in teaching and learning. His low-key but passionate approach to helping students really understand fundamentals struck home with participants in our Teaching Excellence Academy, and it deserves a wider audience. Gord's Distinguished Teacher Award was complemented by an OCUFA award in 2009. You may have to draw something.

Session 100s: 50 minute sessions: 10:00 – 10:50 am

101 - Assessing Innovative Practices: HEQCO's "How To" Guide for Success

Richard Dominic Wiggers, Higher Education Quality Council of Ontario

Valerie Lopes, Centre for Academic Excellence, Seneca College/Higher Education Quality Council of Ontario

Over the past three years, HEQCO has funded dozens of studies aimed at assessing and evaluating innovative student service and teaching and learning practices at Ontario colleges and universities. All of them are designed to enhance student success by better preparing students academically, or better engaging them, usually with some combination of goals (promoting access, retention, academic performance, graduation, etc.)

While assessing proposals submitted to HEQCO it has been often been identified that while the core idea/initiative on which the proposal is focused has great potential, the research design and research questions require significant revisions. Those involved in managing the research have identified the need for a step-by-step guide that can be used as a source of ideas when designing a research project and as a reference guide throughout the research process.

Building on an initiative first undertaken at McMaster University – the development of a Teaching and Learning "Guidebook" – a team of HEQCO experts is developing a manual that we hope will be endorsed by the STLHE, and be made available to faculty and student service providers at colleges and universities across Canada. This manual will provide basic instructions and guidelines for undertaking a formative assessment/evaluation of innovative practices focused on student success. Starting with the identification of the "problem" being addressed, it will take individuals who are often unfamiliar with SoTL through the process from research ethics approval (when required) to the recruitment of study participants and the publication and dissemination of final results.

Participants in this workshop will assist in consultations regarding the draft document. Their input and feedback will inform the final stage in the evolution of a document that we hope will assist the postsecondary community, and faculty and student service providers at postsecondary institutions across Canada. This interactive workshop will focus on gathering ideas about one of the most common challenges faced by researchers; student participation.

102 - Integrating Engineering Courses - A Tale of 3 Instructors, 3 Courses, 4 TAs, 4 Lab Instructors, and 130 First-Year Mechatronics Engineering Students

Mary Robinson, Engineering Undergraduate Office, University of Waterloo

Sanjeev Bedi, Mechanical & Mechatronics Engineering, University of Waterloo

Carol Hulls, Mechanical & Mechatronics Engineering, University of Waterloo

Sami Rahman, Mechanical & Mechatronics Engineering, University of Waterloo

Rayne Lang, Mechanical & Mechatronics Engineering, University of Waterloo

We're told that integration between courses is desirable (Morgan & Bolton, 1998), but how do you actually integrate courses? This is a significant challenge in Engineering, where a minimum amount of material must be covered in a 12-week academic term to maintain program accreditation. Furthermore, to graduate from an Engineering program, a student must demonstrate the 12 CEAB graduate attributes (Engineers Canada, 2011), which include technical knowledge and professionalism, but also communication, leadership, team work, and life-long learning skills. Engineering students need to have opportunities to develop these skills through practice and creating opportunities throughout the undergraduate curriculum can facilitate this.

Engineering is often considered to be a silo program – each course is free standing and packed full of critical course content so that no room for change exists. So what changes must be made to allow course integration to

happen? How can three seemingly unrelated courses, covering the topics of programming, chemistry, and Mechatronics engineering concepts, be combined?

In this workshop, participants will be taken on our journey by starting to integrate some of their courses. We will share some of our integration techniques, such as using similar teaching methods, common examples, and joint projects. Learn more about what prompted Carol, Sanjeev, and Mary to work together, the process that facilitated this coordination, and the resources needed to help students make the connections between the concepts covered in the courses. Sami, a first-year student and Rayne, a senior Mechatronics student who worked as a teaching assistant, will outline the benefits derived from these coordinated efforts. Samples of student work and activities from this past term will also be included.

Morgan, J.R., Bolton, R.W., 1998, An integrated first-year engineering curricula, *Frontiers in Education*, 2: 561-565.

Engineers Canada, 2011, Canadian Engineering Accreditation Board Accreditation Criteria and Procedures, www.engineerscanada.ca/files/w_Accreditation_Criteria_Procedures_2011.pdf.

Session 100s: 25 minute sessions: 10:00 – 10:25 am

103 - Experiential Learning in Undergraduate Pharmacy Curriculum at the University of Waterloo: A Case Study of Co-operative Experience of Pharmacy Students

Certina Ho, School of Pharmacy, University of Waterloo

Brett Morphy, School of Pharmacy, University of Waterloo

Atsushi Kawano, School of Pharmacy, University of Waterloo

Objectives:

Pharmacy has evolved from a dispensing-focused to a patient-oriented health care profession over the last decade. With the anticipated expanded scope of practice in pharmacy, it is important to ensure that training of new graduates in this profession should be well-balanced in both clinical and interpersonal skills. This is an exploratory descriptive case study that attempts to find out if and how the “soft” skills are developed during pharmacy students’ lived experiences of their co-op work terms or experiential learning.

Method:

Students from the Class of 2011, the vanguard class of the School of Pharmacy (SOP), University of Waterloo (UW), were invited to participate in 30-minute individual semi-structured interviews, during which they were asked about their learning experience of co-op placements pertaining to their personal or psychological development, and preparation for their entry-to-practice to the pharmacy profession in Canada. Faculty focus groups were organized to seek their perspectives on how students have evolved throughout the four-year curriculum integrated with co-op training. Student interviews and faculty focus groups were audio-taped, transcribed, and coded using NVivo 9 qualitative research software, accordingly.

Results:

19 (out of 88) pharmacy students from the vanguard class participated in the semi-structured interviews. Two faculty focus groups were held. Interview and focus group data were independently coded by 3 researchers for theme generation. Students expressed their experiential learning experience on medication therapy management, interprofessional collaboration, safety, quality assurance, professionalism, work ethics, and various aspects of “soft” skills that contribute to their personal and intellectual growth (such as communication, problem solving, conflict resolution, etc.). These findings were compared with independent themes captured from the faculty focus groups.

Discussion:

Experiential learning acquired through co-op work terms has offered pharmacy students not only the opportunity to prepare them as practitioners in the pharmacy profession, but also the mechanism to reflect and integrate their interpersonal or “soft” skills in providing patient-focused care in their future career. The “soft” skills acquired during students’ experiential learning are not pharmacy-specific; they can be adapted to other disciplines.

104 - Using Student Feedback to Design a More Effective Clinical Biochemistry Course Component

Andrea Edginton, School of Pharmacy, University of Waterloo

Mary Power, Centre for Teaching Excellence, University of Waterloo

Angela Stark, School of Pharmacy, University of Waterloo

Jane Holbrook, Centre for Teaching Excellence, University of Waterloo

The School of Pharmacy at the University of Waterloo offers an Integrated Patient Focused Care (IPFC) course series to students with the first of nine courses being taught in their second year. Clinical Biochemistry, a traditional, lecture-based section of IPFC1, was not well received by students and their feedback suggested that they were not able to make clear links between laboratory data and patient assessment.

We used student feedback from the 2010 lecture-based course offering to drive the development of a multi-media online learning module and face-to-face instructor-led tutorial to teach the Clinical Biochemistry section of the course in 2011. The design and implementation of the new modules provided us with an opportunity to investigate whether the introduction of multi-media based teaching using virtual lab tours, self-assessments and a single face-to-face tutorial increased student understanding of the connections between the results from lab measurements and patient assessment and whether this teaching format enhanced student engagement.

2010 student feedback indicated that their engagement with clinical biochemistry would be increased by adding more case studies and self-assessments. Students in the 2011 cohort reported an increase of perceived learning gains and performed at a significantly higher level on assessments after the introduction of a blended approach that included more case studies and self-assessments. Students in 2011 did not report significant increases in engagement. The components most effective for content understanding were those suggested by the previous student cohort, namely case studies and self-assessments whereas the virtual lab tours and online discussions were less effective. Student feedback after the introduction of the blended approach indicates that more face-to-face tutorials in this area would enhance the learning experience.

The presentation will focus on the use of student feedback to develop a blended learning experience that enhances student understanding of course content.

105 - Short vs. Extended Answer Questions in Computer Science Exams

Alejandro Salinger, Computer Science, University of Waterloo

Short answer questions such as multiple-choice, true-or-false, or fill-in-the-blank, are popular among instructors when designing written exams in different fields. These types of questions, especially multiple-choice, are suitable for testing a broad range of course topics, while enabling efficient marking and timely feedback for test takers. However, detractors argue that short answer questions fail to measure high level cognitive skills and encourage surface learning approaches.

In this work, we study the suitability of short and extended answer questions in written exams in University-level Computer Science courses. We present an overview of relevant literature on the topic. First, we discuss whether both formats can be used to assess the same set of skills in general, and programming skills in particular. We then discuss the influence of both types of assessment methods on students’ learning approaches, and we review Computer Science instructors’ perceptions about the use of multiple choice items in introductory programming courses.

We finally present our own perspectives on the issue. We argue that, in general, Computer Science courses and jobs require a set of skills that is difficult to assess with short answer questions, and that extended problem solving questions encourage the development of such skills. We suggest, however, that carefully-designed short answer questions are suitable for assessing learning in some cases such as introductory courses, but that exams with short answer questions should be complemented by other types of assessments during the course.

**106 - Teacher's Reflections and Meaningful Experiences Building Community and Sharing Knowledge:
Elementary School Students Visit a Post-Secondary Design Class**

Bernie Murray, Curriculum, Teaching, and Learning, OISE/University of Toronto

The purpose of this showcase is to reflect on valuable experiences of building community, sharing knowledge, and support needed for arts-based education. Presentation information will inform educators of the benefits about community building, mentoring, and professional development from the teacher's lens. This presentation may contribute to practice by recognizing opportunities and support for potential career choices of young students. Learning for faculty at the post-secondary level came from a deep commitment reflecting after the event about experiences, applying knowledge to a design challenge, and creating meaningful connections with Elementary students. Meaningful experiences were a result of reflecting on sharing ideas, providing opportunity, post-secondary students enjoyment of mentoring, observing students engaged in the activity, and considering new ideas about professional development. Post-secondary students reflected on being an Elementary student, interacting on design process, and drawing from prior learning experiences. Information disseminated will benefit academic administrators, educational developers, teaching assistants, and faculty members in higher education by suggesting new ways of mentoring, professional development, and support for arts-based educational programs. Elementary school students attended a higher education design class to learn from students and a faculty member. Design students used this meaningful experience as a mentoring opportunity. Elementary and post-secondary students may use this experience for continued growth and development. A demonstration of artistic design practice was shared with the visiting group. Knowledge sharing was viewed as a valuable experience from students and faculty.

Session 100s: 25 minute sessions 10:25 – 10:50 am

**107 - Learning of Evidence-Based Medicine and Critical Appraisal in Undergraduate Pharmacy Students:
Effectiveness of Voluntary Student-Driven Journal Clubs**

Mary Power, Centre For Teaching Excellence, University of Waterloo

Certina Ho, School of Pharmacy, University of Waterloo

Olla Wasfi, School of Pharmacy, University of Waterloo

Brett Morphy, School of Pharmacy, University of Waterloo

Saurabh Patel, School of Pharmacy, University of Waterloo

Calvin Poon, School of Pharmacy, University of Waterloo

Boris Tong, School of Pharmacy, University of Waterloo

Objectives:

Journal clubs have been instrumental facilitators to students in medicine and dentistry in learning the skills of critical appraisal and incorporation of the best evidence into clinical practice. The goal of this project is to examine the effectiveness of voluntary, student-driven journal clubs in enhancing pharmacy students' learning in evidence-based medicine (EBM) and critical appraisal (CA) of primary literature.

Method:

Monthly journal clubs were scheduled as extracurricular activities, coordinated and hosted by pharmacy students. Journal clubs provided students with the opportunity to present and/or review a selected published study on a

pharmacy topic to their peers, with guidance and assistance from senior pharmacy student mentors. Invitations to journal clubs were sent out to all undergraduate pharmacy students using the Society of Pharmacy Students (SOPhS) mailing lists.

Results:

Four one-hour journal clubs were organized during the Winter Term of 2012 by pharmacy students from the Class of 2012 and the Class of 2014. Approximately 40 students attended each journal club. Students who were involved in journal club presentations and/or discussion will be invited to complete a self-assessment of their knowledge on EBM or CA concepts. Data will be analyzed qualitatively and it is anticipated that students may be more confident and comfortable, after participating in journal clubs, in (1) locating the required information through a focused literature search; (2) critically appraising primary medical literature; (3) formulating clinically relevant conclusions from research studies; (4) applying patient-oriented measures to a clinical situation; and (5) presenting a clinical decision based on the assessment of a valid research study.

Discussion:

During an academic term where daily practice and interactions with patients may not be feasible, journal clubs can certainly offer an open forum for pharmacy students to discuss patient-focused clinical scenarios, search, and critically appraise primary medical literature, and subsequently applying EBM in practice. It is possible that journal clubs can be expanded and adopted interprofessionally, such that students from other health care disciplines can collaborate, critique current primary literature, and discuss clinical scenarios.

Deenadayalan, Y., Grimmer-Sommers, K., Prior, M., & Kumar, S. (2008). How to run an effective journal club: A systematic review. *Journal of Evaluation in Clinical Practice*, 14, 898-911.

Lee, A.G., Boldt, H. C., Golnik, K.C., Arnold, A. C., Oetting, T. A., Beaver, H. A., et. al. (2006). Structured journal club as a tool to teach and assess resident competence in practice-based learning and improvement. *Ophthalmology*, 113, 497-500.

McLeod, P., Steinert, Y., Boudreau, D., Snell, L., & Wiseman, J. (2010). Twelve tips for conducting a medical education journal club. *Medical Teacher*, 32, 368-370.

Swift, G. (2004). How to make journal clubs interesting. *Advances in Psychiatric Treatment*, 10, 67-72.

108 - Looking for Evidence of Deep Learning in International Economics

Barb Bloemhof, Department of Economics, University of Waterloo

An important consideration in choosing an instructional technology is its effectiveness for students' experience of the learning process, although often the evaluation is ex post of the choice. In order to investigate the effectiveness of problem-based learning, a non-traditional, more self-directed instructional approach, as a way to foster deep learning in a second year survey of international economics, I use two questionnaires from the family of Lancaster Approaches within a repeated measures design. Other available data are the students' course grades, their responses to an inventory of learning preferences, and the qualitative analysis of their reflection assignment in the course. This paper will present preliminary findings of the first known offering of authentic (McMaster model) problem-based learning in an economics context. Through a structured discussion, participants will have the opportunity to develop a perspective on the methodological issues associated with the assessment, and learn about how this instructional technology was implemented and supported within the course design.

109 - Developing a Model for the *Certificate in University Language Teaching*

Barbara Schmenk, Germanic and Slavic Studies, University of Waterloo

Svitlana Taraban-Gordon, Centre for Teaching Excellence, University of Waterloo

In this session we will present our plans for building upon the successful Teaching Assistant (TA) Seminar offered by UW's Department of Germanic & Slavic Studies since 2004, developing it into the new *Certificate in University Language Teaching (CULT)*, in collaboration with the UW Centre for Teaching Excellence (CTE). The overarching goal of the proposed certificate is to provide UW language TAs with theoretical and practical knowledge about language education, as well as specific language teaching skills, so as to enhance their employability in the academic job market. While we initially envision the certificate to be housed in the department of Germanic & Slavic Studies, if successful, the model can be scaled to include interested graduate students from other language departments on campus.

After a quick brainstorm on the components of the 'ideal' university language teaching certificate program, we will share our preliminary ideas about the contents and structure of the proposed certificate model. Participants will have an opportunity to ask questions and provide feedback on the certificate design.

110 - Teaching Mentor Program

Robert Sproule, School of Accounting and Finance, University of Waterloo

Greg Berberich, School of Accounting and Finance, University of Waterloo

Julie Timmermans, Centre for Teaching Excellence, University of Waterloo

All junior faculty, both tenure stream and continuing appointments are encouraged and supported in developing formal mentoring agreements with one or more mentors based on individual teaching needs.

What needs to be done to implement an effective and supportive teaching mentor program? This showcase will share from three perspectives – from a strategic perspective (Associate Director – Teaching and Learning), from a design perspective (Centre for Teaching Excellence) and from a participant perspective (one of the mentors).

The School of Accounting and Finance uses a series of 4 workshops run during a term to train internal mentors. The 4 workshops cover: defining effective teaching, exploring the scope of teaching and the mentors as teachers, and the characteristics and roles of mentors/mentees. Tools used to support these activities included completion of Teaching Perspective Inventory (TPI) and participation in Teaching Squares. In addition reference is made to our Teaching Mentor Handbook.

An important perspective utilized in running the workshops is the mentors as learners. The workshops principles of deep learning as listed in the Task Force Report on Innovative Teaching Practices to Promote Deep Learning are utilized. The development of knowledge, for example in the context of the development of a statement on effective teaching, can be applied when mentoring. Through the sharing during the workshops mentors will see concepts about teaching differently. Through the completion of the TPI and other preparatory activities, the mentors will engage in independent, critical and analytical thinking about their teaching.

The presenters will inform attendees who may be considering their own teaching mentor program along with receiving feedback on perspectives to consider for further development of their program.

Session 200s: 50 minute sessions: 11:00 – 11:50 am

201 - Wired and Deep: Is It Possible?

Aldo Caputo, Centre for Extended Learning, University of Waterloo

Pia Marks, Centre for Extended Learning, University of Waterloo

Leeann Ferries, Recreation and Leisure Studies, University of Waterloo

Rudy Peariso, Centre for Extended Learning, University of Waterloo

Amelia Clarke, Environment and Business, University of Waterloo

This session explores how deeper learning outcomes can be achieved in a fully online context. Instructors from an undergraduate online course and a graduate online program share some of the successful strategies they've used to help their students achieve the kinds of outcomes associated with deeper learning, as articulated in the graduate and [undergraduate degree level expectations](#). These include the ability for students to:

- engage in critical and analytical thinking, both inside and outside the discipline,
- apply learning from one or more areas outside the discipline,
- solve authentic problems,
- work effectively with others, and
- recognize the limits of their own knowledge and ability.

Students in **REC 251** (Therapeutic Recreation: Developmental and Emotional Disabilities) are encouraged to delve more deeply into disciplinary ways of thinking by participating in an interactive client-therapist interview simulation. The simulation invites them to think analytically about the client-therapist interaction, to make connections between principles learned in the course and what they observe in the interview, and to reflect actively on what they've learned through the experience.

Students in the **Masters of Environment and Business (MEB)** graduate program regularly apply what they've learned in their courses to solve authentic and complex problems in unfamiliar contexts. The presenter will showcase a number of activities designed to help students come to see concepts and ideas differently as they engage in real-world problem solving.

The impact of these approaches on student learning will also be addressed.

202 -Culturally Relevant and Responsive Pedagogy and Policy: Implications for the Ontario Science Classroom

Allison Ritchie, Curriculum, Teaching, and Learning, OISE

Neil Ramjewan, Curriculum, Teaching, and Learning, OISE

How do we meet the needs of an increasingly diverse classroom and bridge the gap between the implementation of Ontario's 2009 Equity and Inclusive Education Strategy and culturally responsive teaching in the classrooms? Culturally Relevant Pedagogy (CRP), an extension of Social Constructivism (SC), provides a pragmatic framework that attempts to meet the needs of individual students regardless of cultural background, native language, gender, sexual orientation, religion, socioeconomic status, learning style and ability. This workshop aims to review the impacts of students with intersecting identities and differing access to scientific knowledge and resources grounded in the context of the Canadian classroom. We propose an intervention strategy that promotes student choice and a critical discourse of power and privilege, thus, supporting students in claiming voice and space in the creation and completion of tasks. Our hands-on, participatory action-based workshop explores the CRP ideologies through junior/intermediate curriculum-based activities that will interrogate both students and teachers' assumptions and perceptions of the nature and practice of science, and contribute to the ongoing discussion of what it truly means to be inclusive in the scientific community.

Session 200s: 25 minute sessions: 11:00 – 11:25 am

203 - Learning to Think Spatially: Identifying Threshold Concepts and Troublesome Knowledge in GIScience Education

Su-Yin Tan, Department of Geography and Environmental Management, University of Waterloo

Carina Xue Luo, Academic Data Centre, Leddy Library, University of Windsor

Dongrong Li, Department of Geography and Environmental Management, University of Waterloo

James McCarthy, Mapping, Analysis and Design, University of Waterloo

The idea that misconceptions pose a barrier to learning is now well established and used to inform pedagogical strategies in a range of disciplines. Geographic Information Science (GIScience) educators face a variety of challenges, which ultimately affects how students perceive and process spatial information. This research explores the role of misconceptions, troublesome knowledge, and threshold concepts in determining the efficacy of teaching and learning GIScience.

A multidisciplinary approach is adopted by exploring a large body of literature from science, technology, engineering, and mathematics (STEM) education relevant to GIS theory and applications. By matching existing empirical studies from other STEM fields to the core concepts of GIScience, a preliminary map of potential threshold knowledge barriers and misconceptions is constructed for further empirical investigation by means of a survey instrument. Funded by a CTE Learning Initiative Fund (LIF), this presentation will provide a project update on preliminary results of a survey conducted on a test course, GEOG/PLAN 281 "Introduction to GIS" at the University of Waterloo.

Although this research is specifically geared towards improving GIS teaching strategies and learning outcomes, challenges with identifying key barriers, misconceptions, and troublesome knowledge are relevant for educators from all disciplines. This research demonstrates how a survey instrument can be developed based on in-class questionnaires to identify challenges posed to teaching a STEM-related field. Survey design and methods adopted for mapping potential misconceptions and knowledge barriers will be discussed. We also consider how findings from this research can be utilised for assisting instructor development, teaching effectiveness, and improving learning outcomes in the classroom and lab environment.

204 - Team-Based Learning

Patricia Hrynchak, Optometry, University of Waterloo

Graduates require the ability to use critical thinking skills and work effectively in a team as part of an overall set of competencies. Therefore, educational programs should use appropriate teaching methods based in educational theory to promote deep and applied learning. Team-based learning (TBL) is a method that was developed by Larry Michaelsen for business education and has recently been introduced in healthcare education to foster critical thinking skills while students work in high functioning teams.

In TBL there are three phases. The first phase is independent study assigned by the instructor, the second phase is readiness assurance (determined using individual and group tests), and the third phase is group application exercises. Students are provided with opportunities to expose inconsistencies between their current understandings and new experiences thus stimulating development of new personal mental frameworks built upon previous knowledge. The learning is active using relevant problems and group interaction which is facilitated by one instructor. Team-work skills are strengthened by focused reflection on new experiences during the group sessions and on teamwork success by providing feedback to group members.

The presenter has used TBL in a Case Analysis course at the School of Optometry for two terms. It was very well received by the students and faculty members who chose to observe. Video of the teaching method will be shown

which demonstrates the method being used in the classroom. This will be followed by a discussion of the success and challenges of implementation.

The learning objectives of this presentation are to be able to describe the steps used in TBL and appreciate the advantages and disadvantages of using the method. The attendees will be exposed to a teaching method which is does not require as many facilitators as do small group methods and is able to promote deep learning in large groups.

205 - Development of a Web-Based Evidence-Based Medicine (EBM) Course for Undergraduate Pharmacy Curriculum at the School of Pharmacy, University of Waterloo: Phase I

Boris Tong, School of Pharmacy, University of Waterloo

Certina Ho, School of Pharmacy, University of Waterloo

Objectives:

Evidence-based practice is the focal point of the current era of clinical practice. As the quantity and complexity of clinical study grows, clinicians must be able to effectively screen, decipher, and apply these complex medical literatures appropriately to their patients. The objective of this independent study project is to develop a web-based education program tailored to students at the University of Waterloo School of Pharmacy (SOP) to improve their knowledge, skill, and attitude towards Evidence-Based Medicine (EBM).

Method:

Phase I of this project focused on finding the optimal method of delivering web-based EBM education. An environmental scan of existing web-based EBM courses in North America was performed, which include (1) the Michigan State University online EBM course for primary care faculty (<http://omerad.msu.edu/ebm/index.html>); (2) the University of Illinois online Evidence-based Practice tutorials for clinicians including pharmacists (<http://ebp.lib.uic.edu/>); (3) the Centre for EBM of the Knowledge Translation Clearinghouse in Toronto EBM tutorials for different health care specialties (<http://kclearinghouse.ca/cebm>); and (4) the Canadian Pharmacist Association EBM continuing education module for practicing pharmacists (<http://www.pharmacists.ca/index.cfm/education-practice-resources/professional-development/adapt/>). Teaching/learning needs assessments of both faculty and students for web-based EBM training were also conducted at the SOP.

Results:

Review of current web-based EBM courses revealed common themes, strengths, weaknesses and usability, which are helpful for Phase II of this project – the actual design of the web-based EBM course for pharmacy students. Analysis of the teaching/learning needs assessments identified strengths and learning gaps of the current delivery of EBM education at the SOP, determined the priorities of EBM teaching and learning, and students' preference for various EBM-related topics.

Discussion:

It is imperative that the SOP has a complete EBM education module tailored to its unique co-op and integrated curriculum and prepare future pharmacy practitioners who are capable to use and critically appraise evidence from relevant sources for patient care. Activities performed in Phase I of this project - environmental scan of existing teaching/learning resources and needs assessments of both faculty and students on the subject area of interest – will also relevant to other disciplines, in particular, the biomedical sciences.

Session 200s: 25 minute sessions: 11:25 – 11:50 am

206 - From the Agora to the Chinese Room: On Transferring Pedagogical Lessons Learned to New Contexts

Shannon Dea, Philosophy, University of Waterloo

For many post-secondary educators, innovative teaching approaches are context specific. Unlike elementary and secondary educators who typically have education degrees and whose teaching is thus informed by particular theoretical approaches, many post-secondary instructors teach “on the fly”: we discover new approaches as *ad hoc* solutions to particular pedagogical challenges in particular courses and environments. What happens when those contexts change?

This paper is a “bridge” between past research I conducted on small-group teaching methods in lower -division Philosophy courses to my upcoming field research on applying these methods in highly intensive summer courses taught to ESL students in China. My earlier study showed that well-structured small-group work effectively promotes students’ deep engagement with difficult course readings. However, in the summer 2012 courses that will be the site of my new research, the intensity of the class schedule and students’ struggles with English will make it difficult or impossible for them to do their readings before class.

Is reading an intrinsic part of study in the humanities, as many professors believe, or is it a mere means to an end? Is it possible that carefully planned small-group work can constitute not merely a way “into” course readings, but, more radically, a way “around” them – a means of achieving deep learning when students are unable to do the readings at all?

I begin with an overview of the earlier study, then move on to a description of the context and the particular pedagogical challenges of my summer 2012 teaching, how I plan to adapt the previous methods for this new context, and my hypothesis about what I’ll learn. If this experiment is successful, it will have implications not only for teaching abroad, but also for teaching ESL students and disabled students at home. I conclude by sketching some of these implications.

207 - Online Patient Cases: A Study Combining Virtual and Live Cases in a Pharmacy Laboratory

Mary Power, Centre for Teaching Excellence, University of Waterloo

Lisa McLean, School of Pharmacy, University of Waterloo

Lisa Craig, School of Pharmacy, University of Waterloo, and Two Rivers Family Health Team

Patient information gathering skills are a vital component of a health professional’s repertoire. In the pharmacy undergraduate program at Waterloo these skills are currently practiced in the Professional Practice Labs in years 1-3 utilizing standardized patients in combination with peers as “patients”. Students continue to struggle with gathering information from the “patient” as evidenced by their scores on the Objective Structured Clinical Examinations (OSCE) administered at the end of term. There has been some evidence with students in other health professions that virtual patients have been beneficial. We set out in this study to determine the effect of using virtual patient cases in the laboratory and what blend of virtual and standardized patients would be optimal.

We designed ten cases for the first year Professional Practice students and created online modules of these cases using articulate™ Studio and text versions for the standardized patient actors. Students were randomly placed into groups and assigned various blends of virtual cases (0-5) and standardized patient cases (5-0; for a total of 5 cases) to be worked through in the first five weeks of term. In the second half of term the students were given the reverse blend of virtual and standardized patient cases (for a total of 5 of each for the term). An OSCE was administered to all students at weeks 0, 6 and 12. Students were also invited to complete a survey at the end of term to assess their attitudes toward the use of virtual cases in the lab.

The pre-, mid- and post- OSCE outcomes showed no significant difference between any group. Surveyed students reported that they valued the virtual cases but feared their replacement of the standardized patients. We will report on our analysis to date and next steps moving forward.

208 - The Use of Smart Phone Technology to Facilitate Deep Learning

En-Shiun Annie Lee, Department of Systems Design Engineering, University of Waterloo

Smart phones have changed the digital landscape in the past few years. There are currently over three billion mobile phone subscribers in the world, survey data shown nearly a third of subscribers are smart phone user and the market is increasing. In fact, in 2010 smart phone users increased nearly 50%[1]. Modern mobile learning applications are built based on the versatile functionality of smart phone which revolutionized the mobile ability of reaching the potential learners based on the location-specific and time-specific information. Some of the most common practices utilize the smart phone in conventional ways such as web browsing, photo and video-making, and [2]. The other most common type of mobile learning is embedded in smart phone applications, such as instant polling and games [3].

This paper explores the use of smart phone to foster deep learning inside and outside the classroom. The first experiment examined time-specific and location-specific pull mobile alarms that disturb a smart phone user throughout the day. The second experiment examined how students use their smart phone devices in a classroom setting. This paper proposes how the smart phone can be used to foster deep learning: during the class to query students, as well as before and after the class by previewing and reviewing the classroom materials learned.

Smart phones have the ability to acquire the precise location of the user while competing for the students' attention. Educators have not yet explored how smart phones can be used in the classroom setting to promote deep learning. This presentation will suggest several methods to utilize the smart phone to foster deep learning in the university classroom.

[1] Cozza, R. Forecast: Mobile Communications Devices by Open Operating System, Worldwide, 2008–2015, <http://www.gartner.com/DisplayDocument?ref=clientFriendlyUrl&id=1619615>

[2] The 2009 Horizon Report. The New Media Consortium. 2009 < <http://www.nmc.org/pdf/2009-Horizon-Report.pdf> >

[3] Marc Prensky. What Can You Learn From A Cell Phone? < http://www.marcprensky.com/writing/prensky-what_can_you_learn_from_a_cell_phone-final.pdf >

301 - Panel Discussion on Deep Learning Across the Curriculum

Veronica Brown, Centre for Teaching Excellence, University of Waterloo

Oscar Nespoli, Mechanical & Mechatronics Engineering, University of Waterloo

Nancy Vanden Bosch, School of Accounting and Finance, University of Waterloo

Anne-Marie Fannon, Waterloo Professional Development Program, University of Waterloo

To foster deep approaches to learning, we are encouraged to vary the conditions under which learning occurs, ask our students to find new ways to represent information we share with them, and to “consider carefully the balance between how much and how well something is learned” (Halpern & Hakel, 2003, p. 41). But can such initiatives be fully successful if they are isolated experiences throughout the student’s degree? What role does the design of the overall curriculum play in encouraging deep approaches to learning? As Entwistle (2010) suggests, to understand the outcomes of our students’ learning, we must look at the whole teaching-learning environment.

At this session, we will explore how curriculum design and renewal can complement individual instructors’ efforts to encourage deep learning. Three panelists, representing different disciplinary perspectives, will share how they are applying curriculum development strategies to encourage deep learning throughout their curriculum. Each panelist’s program is at a different phase of curriculum development (i.e., design and development, implementation, and evaluation). The experiences of the panelists will serve as a foundation for our interactive discussion on the challenges of encouraging deep approaches to learning throughout the curriculum.

Entwistle, N. (2010). Taking stock: An overview of key research findings. In *Taking stock: Research on teaching and learning in higher education*, eds. J. Christensen Hughes & J. Mighty, 15-51. Montreal & Kingston: Queen’s Policy Studies Series, McGill-Queen’s University Press.

Halpern, D.F., & Hakel, M.D. (2003). Applying the science of learning to the university and beyond: Teaching for long-term retention and transfer. *Change: The Magazine of Higher Learning*, 35(4), 36-41.

302 - Doctoral Students and a Learning Community: Opportunities for Community Building, Research, Reflection, and Meaningful Experiences

Bernie Murray, Curriculum, Teaching, and Learning, OISE/University of Toronto

Pooja Dharamshi, Curriculum, Teaching, and Learning, OISE/University of Toronto

Eveline Houtman, Curriculum, Teaching, and Learning, OISE/University of Toronto

Julie Middleton, Curriculum, Teaching, and Learning, OISE/University of Toronto

The purpose of this workshop is to share experiences about a doctoral student learning community. Through presentation information and small group discussion participants who attend this session will learn about students’ experiences in a doctoral course. A learning community was established by a group of doctoral students in the class. The rationale for starting this learning community was to provide support to each other through the course and later during the thesis stage of the doctoral degree. The learning community is composed of four students. The students are first year doctoral students with the exception of a third year student. One student is fulltime and three are in the flex-time option. This learning community is student driven and therefore the professor’s role is with minimal involvement. In this year-long course colloquium students attended class on an alternating weekly schedule. The focus of the proseminar course was to introduce students to doctoral work and academic life. Students were encouraged to organize study groups to continue class discussions, share resources about conference proposals, teaching experience, or information about academic jobs. The students used this meaningful experience as support and personal development. This presentation may contribute to practice by recognizing important aspects of support for graduate students throughout their studies. The information from

this session will be a benefit to academic administrators, educational developers, teaching assistants, and faculty members in organizational positions at the graduate level in higher education.

Objectives:

1. To provide doctoral students' perspectives about a student-initiated learning community
2. To report aspects of the collaborative journey from reflections or supportive experiences
3. To explore aspects of the course that were rewarding or challenging
4. To discuss how mentoring and supportive learning communities developed by the students can improve experiences throughout the doctoral journey

Session 300s: 25 minute sessions: 2:10 –2:35 pm

303 - Co-Operative Education and Internship: Recent HEQCO Research on the Effectiveness of Work Integrated Learning (WIL)

Richard Dominic Wiggers, Higher Education Quality Council of Ontario

Over the past two years, the Higher Education Quality Council of Ontario (HEQCO) has partnered with 14 Ontario colleges and universities to undertake one of the most detailed and comprehensive examinations of the full range of work integrated learning (WIL) options ever completed in Canada. While co-op placements, internships, etc. are designed to enhance student success by better preparing students for the work force upon graduation, many student, faculty and employers still don't understand the full range of options that WIL comprises, and how effectively they are being implemented.

In Phase 1 of this multi-year project, an agreed framework for defining various postsecondary WIL programs was developed. Phase 2 is currently underway and included a faculty survey completed in the spring of 2011 (with a final report published in March 2012), and a student survey and employer survey, both undertaken in March/April 2012. Drawing on results from the faculty survey, and preliminary findings from the student and employer surveys, this presentation will focus on two of the most common WIL options – Co-Operative and Internship – to examine some of the challenges and opportunities that each provides.

How do more structured WIL opportunities compare in effectiveness to student experience gained from non-WIL part-time and summer employment? What efforts are being made to ensure that formal definitions (of Co-Op in particular) are being adhered to? How good a job are post-secondary programs doing in "integrating" the workplace with the academic learning? Most importantly, what is the future likely to hold in Canada when it comes to current efforts to vastly expand WIL opportunities?

304 - Supplementary Course Modules – A Self-Directed Optional Component to Aid in Reinforcing Prerequisite Material

Tina Balfour, Learning Services, Wilfrid Laurier University

You are teaching MA100, which has Grade 12 Advanced Functions listed as a prerequisite, and you know all of your students have obtained credit for the high school course. The material you are about to discuss requires the students recall a concept from the prerequisite course – a concept which many have forgotten, and which others swear they have never been taught. Your course is already jam-packed full of material you are obligated to teach, so how will you ever find time to help your students relearn the foundational skills. Or should you? Should it be the students' responsibility to do this on their own? After all, the course description clearly indicates the prerequisite. But, if left to their own will, more often than not, students are reluctant to help themselves.

The Mathematics Assistance Centre at Wilfrid Laurier University has worked In conjunction with the Department of Mathematics to create a program, administered through an online environment, that encourages students to

review fundamental math skills from the high school curriculum that are necessary for success in an introductory calculus course. Student's progress through units, or modules, of material, each of which starts with basic facts and builds to the level of difficulty expected in a university level course. Students complete the work on their own time. And they do it.

This session will describe the Supplementary Course Module program used at Laurier as an optional component to three 100-level calculus courses, and will share the amazing results we have seen thus far. Colleagues will also get an opportunity to discuss how the approach could be adapted for their own needs.

305 - Using Twitter to Enhance Communication and Engagement in Large Enrolment Classes

William Power, Chemistry, University of Waterloo

For any of you with teenagers in your house, you know that email is no longer the medium of choice. Text messaging, and especially Twitter, has replaced it as a more convenient and rapid choice for communication among young people today. In this showcase, I will present my experience using Twitter in large, first-year Chemistry classes at Waterloo over the last 2 years. I'll include my motivation, my initial steps, the way I integrate it into the course, and some decisions I have made concerning my use of it to most effectively engage my students in an appropriate manner. The ability to "continue the discussion" in a convenient public forum – distributed directly to them rather than requiring their active entry through some portal – promotes more reflection on the course material outside of the lecture periods. It facilitates the "response-extension-deeper response" exchange essential to the initial steps of deeper understanding, in full view of the rest of the large class. My conclusion is that Twitter is an excellent communication tool that can enhance the engagement of our students in a way that is both appropriate to our educational goals and respectful of all the participants.

306 - Investigating the Effectiveness of Drama as an Engagement Learning Methodology in an Integrated Therapeutics Course

Tejal Patel, School of Pharmacy, University of Waterloo

Elaine Lillie, School of Pharmacy, University of Waterloo

Jennifer Roberts-Smith, Drama and Speech Communication, University of Waterloo

Nancy Waite, School of Pharmacy, University of Waterloo

Background/Rationale

Active learning encourages better conceptual understanding, student engagement and attendance.^{1,2,3,4} Results from two university level investigations, using drama among students as a form of active learning, indicate that this methodology enhanced communication, negotiation and teamwork skills while allowing for greater understanding, creativity and an increased confidence.^{5,6}

Objectives:

This study was designed to investigate whether using student-created dramas was effective in developing student learning, engagement and confidence in a third year pharmacotherapeutics course.

Methods:

This quasi-experimental study was conducted over two years, Spring 2010 (S2010) and 2011 (S2011). Content was delivered through faculty lectures in both years. During S2010, 5-6 member student teams delivered case-based power-point presentations; in S2011 teams presented case-based problems through 10-minute dramas. Exam and case presentation marks were compared. Additionally, students were surveyed about the impact of case presentation style on their confidence, and engagement (captivation of interest (CI), and enthusiasm for learning (EL)).

Results:

Mean marks for exams and case presentations improved significantly from S2010 to S2011 (midterm 1: 75.9% (S2010) vs. 80.1% (S2011), midterm 2: 67.9% (S2010) vs. 75.9% (S2011), final: 67.4% (S2010) vs. 72.9% (S2011)); mean case presentation marks (86.8% (S2010) to 89.5 % (S2011)).

Survey results indicate that when student presented cases as dramas, confidence decreased (mean score 4.39 (S2010) to 3.89 (S2011); $p < 0.05$); all other measures (mean scores) indicated no significant differences (confidence in watching case presentations: 3.35 (S2010) vs. 3.20 (S2011); engagement in either watching (CI: 3.42 (S2010) vs. 3.67 (S2011); EL: 4.06 (S2010) vs. 3.72 (S2011) or presenting (CI: 4.10 (S2010) vs. 3.92 (S2011); EL: 3.35 (S2010) vs. 3.39 (S2011)) cases.

Implications:

Although performance on objectives measures improved, student confidence when presenting dramas decreased. This decrease in confidence may result from the students' lack of experience with creating dramas and warrants further examination.

References

1. Powell K. Spare me the lecture. *Nature* 2003; 425: 234 – 236.
2. Knight JK and Wood WB. Teaching more and lecturing less. *Cell Biol. Educ.* 2005; 4: 298 – 310.
3. Walker JD, Cotner SH, Baepler PM, et al. A delicate balance: integrating active learning into a large lecture course. *CBE – Life Sci. Educ.* 2008; 7: 361 – 367.
4. McClanahan EB and McClanahan LL. Active learning in a non-majors biology class. *College Teaching* 2007; 50: 92 – 96.
5. Pearce G and Sutton-Brady C. International Business Theatre (IBT): an alternative evaluation method for enhancing student learning in international marketing. *Assess. & Eval. In Higher Educ.* 2003; 28: 3 – 15.
6. Barry AM. Active learning using Drama In Education (DIE) approach in large group teaching in Economic Geography. *AISHE Conference 2006: Creating and Sustaining an Effective Learning Environment*; August 2006. Maynooth, Ireland.

Session 300s: 25 minute sessions: 2:35 –3:00 pm

307 - Measuring Change and Learning Effectiveness After Using a MATLAB Tool in First-Year Chemical Engineering

Mary Robinson, Engineering Undergraduate Office, University of Waterloo

Luis Ricardez, Chemical Engineering, University of Waterloo

Raymond Legge, Chemical Engineering, University of Waterloo

How can effectiveness in student learning be measured? What confounding factors should be considered when measuring learning effectiveness? How can changes in student attitudes and behaviours demonstrating effective learning be measured in a 12-week academic term? We have attempted to address these questions in our work with first-year Chemical Engineering (ChE) students.

MATLAB is a high-level technical computing software used by ChE students to solve computationally-challenging problems. A MATLAB Tool has been designed, using a standard problem-solving methodology (*Woods, 2000*), to present solutions to common ChE problems. The Tool incorporates material from first-year ChE courses based on focus group feedback from upper-year ChE students and course instructors. The intended use of the MATLAB Tool is for first-year ChE students to practice their programming skills out-of-class and at their own pace, using challenging problems drawn from other courses taught during the same academic term to demonstrate how the course concepts can be integrated.

A preliminary version of this Tool was introduced to a cohort of 1B ChE students in Winter 2011, with integration of the Tool in the Spring 2011 and Winter 2012 term courses. Pre- and post-surveys were used to measure student attitudes between the start and end of the academic term, along with open input from a student focus group (*George and Cowan, 1999*). Preliminary results from the study cohorts and alignment to the effectiveness goals will be shared and discussed.

George, J., Cowan, J., *A Handbook of Techniques for Formative Evaluation*, Kogan Page, London, 1999.

Woods, D. R., 2000, An Evidence-Based Strategy for Problem Solving, *Journal of Engineering Education*, 89(4): 443-459.

308 - What is the Purpose of Lab Courses? Re-evaluating Chemistry Lab Practices

Julie Goll, Chemistry, University of Waterloo

As an instructor I have found that students can explain *what* they have done in a lab course very well. What they often struggle with are the *whys* and *how's*. In an effort to encourage students to think more deeply about the labs that they conduct in my courses I have shied away from the "traditional" lab report in favour of report templates, assignments and oral quizzes. The goal I have for my students is they not only leave my lab with a better understanding of organic chemistry but that they can also make independent decisions about an experiment in a research setting (academia or industry).

In this showcase I will discuss different types of assessments that I have used in my organic chemistry lab courses. These include both online and written pre-lab work, in-lab oral quizzes and post-lab written assignments (informal lab report templates and journal article style reports). What is particularly important in these assessments is the style of questions asked.

In terms of workload, many of the students find these types of assessments more challenging and some struggle with the fact that you cannot simply "look up" the answer, but rather have to think it through. For students who have a good understanding of what is going on in the lab, these reports take less time and they get more out of them (quality rather than quantity). My teaching assistants are very happy with these styles of assessments as it reduces the time they have to spend marking.

The most rewarding is that the results of these changes have allowed my students to become more independent thinkers in an organic chemistry lab environment, leading to their success in an organic chemistry research setting.

309 - A Survey of Wiki Based Collaborative Learning Environments for Interdisciplinary Training of Students in Math and Biology

Rahul Rahul, Department of Applied Mathematics, University of Waterloo

Over the past decade, wikis have become a trusted and preferred technology for sharing and management of knowledge on the World Wide Web. A wiki is a website whose contents can be edited and managed by the users of the website collaboratively. Wikis offer many technical advantages for knowledge sharing and management in both research and teaching domains. Members of wiki community can (i) collaboratively engage in page creation, (ii) build and develop their own topics, (iii) link multiple pages to each other, and (iv) edit or create pages, via easy editing environment and simple version control. As a result, wikis have gained popularity for training of students in interdisciplinary studies in math and biology where collaborative skills are essential. In our presentation we will discuss the technical advantages of wikis for classroom teaching. Examples of wiki websites that are used in teaching at the university level will be presented.

310 - Guiding Pharmacy Students to Adopt a Patient-Centered Practice: Exploring the Problem of Medication Non-Adherence

Vivian Lee, School of Pharmacy, University of Waterloo

Certina Ho, School of Pharmacy, University of Waterloo

Background and Objective:

While pharmacy curricula across Canada focus on learning about the science and therapeutics of drugs, students have less of an opportunity to appreciate the complexities behind *medication non-adherence*, a behaviour where patients do not take their medications as prescribed. Gaining insight into this problem encourages pharmacy graduates from the University of Waterloo (UW) to adopt a more patient-centered approach when assessing, designing and providing drug therapy. Thus, a student project was conducted to explore how patient adherence to oral bisphosphonates can be improved in community pharmacy practice. Bisphosphonates are a class of medication used long-term to prevent and treat osteoporosis. Studies reveal that 20-30% of patients who started taking a bisphosphonate will discontinue the drug as early as within 6 months. Complex administration requirements of oral bisphosphonates are commonly reported by patients as a prominent barrier to adherence.

Method:

The student performed a literature review and learned that educational approaches involving multiple senses in the patient's learning process are more likely to improve medication adherence. While patient education in community pharmacies have been limited to verbal counseling and providing information leaflets, multimedia, such as video-based education, is largely unexplored. Videos can visually demonstrate proper drug administration and can be reviewed multiple times by patients to reinforce learning.

Deliverables:

To address the complexity of bisphosphonate administration, the student developed a multi-faceted educational intervention consisting of: 1) a video clip on proper administration of risedronate (a type of bisphosphonate), 2) a medication information leaflet, and 3) a pharmacist's follow-up phone call to the patient to address any questions or concerns about taking risedronate. A validated questionnaire¹ will be used to measure patients' self-reported adherence to risedronate before *and* four weeks after these three components are administered.

Implications:

This project is an example where students use critical thinking to recognize potential non-adherence in patients (e.g., to risedronate therapy), determine factors contributing to such non-adherent behaviour (e.g., complex administration requirements), and set a strategy or action plan to address those factors (e.g., develop a multimedia intervention to educate patients on proper drug administration). Understanding and addressing *medication non-adherence* is essential in pharmacy education for training students to become patient-centered clinicians.

Breuil V, Cortet B, Cotté FE, Arnould B, Dias-Barbosa C, Gaudin AF, et al. Validation of the adherence evaluation of osteoporosis treatment (ADEOS) questionnaire for osteoporotic post-menopausal women. *Osteoporos Int* 2012 Feb;23(2):445-55. Epub 2011 Apr 6

Session 400s: 50 minute session: 3:10 – 4:00 pm

401 – LEARN User Group

This session will provide an opportunity for participants to see examples of innovative ways that instructors are using Waterloo LEARN in their courses on campus.

Jonathon Histon and Jim Wallace, SYDE 348 – Engaging Students

User-centred design focuses on engaging different stakeholders and users throughout the design process. Course instructors will show how they used LEARN tools to manage student projects, help encourage students to stay on top of course readings, and to get students to see and think about how user-centred design applies in their daily lives. In particular they will show how the use of a Twitter feed supported these goals and the advantages gained for both students and instructors.

Stefan Idziak, PHYS 112 - Self-Marked Assignments

Self-marked assignments have been introduced into a first year physics course intended for student in the life sciences. The rationale behind this assignment will be discussed and a description of how this was incorporated into LEARN will be presented. Consequences to academic integrity will be described.

Sara Ashpole, ENVS 131 and ENVS 195 - Lessons Learned Using Turnitin

Turnitin plagiarism detection software can be used to assess students' ability to cite correctly and write in their own words. Depending on the approach, online grading can facilitate individual assessment and group writing trends. Turnitin may also be used as an individual learning opportunity. Experiences will be shared about different approaches with two first year courses in environmental studies.

Session 400s: 25 minute sessions: 3:10 – 3:35 pm

402 - A Template for Online Overseas Collaboration in the Transcultural Classroom

Grit Liebscher, Germanic and Slavic Studies, University of Waterloo

Christine Kampen Robinson, Germanic and Slavic Studies, University of Waterloo

Recent advances in technology have made long-distance projects possible and affordable but not without challenges due to institutional, cultural and linguistic constraints. This paper discusses the nature of such constraints as well as learning opportunities and outcomes of one project. Based on this case project, we will suggest a template for similar kinds of overseas collaborative teaching initiatives that can potentially be carried out in any university subject.

The case project was a collaboration between Canadian learners of German as a second language and German learners of English as a second language that was carried out in 2010 and 2011. Students from each class worked in pairs on a transcultural task which involved the comparison of a German and a Canadian TV series, *Türkisch für Anfänger* (*Turkish for beginners*) and *Little mosque on the prairie*. These series were chosen because they provocatively present intercultural issues and stereotypes but also invite discussion and reflection. The learning objectives of the task were two-fold: 1) to raise students' cultural awareness about another culture as well as their own, and 2) to sensitize students to verbal and non-verbal forms of cultural expression. Byram's (1997, 2008) framework of intercultural communicative competence as well as research on similar long-distance collaboration (e.g. Levine, 2008) served as the theoretical back-drop for this project.

The discussion of constraints, learning opportunities and outcomes is based on the instructor's insights from the teaching of the project as well as on a qualitative analysis of data collected from it, including chatroom interactions, weekly student journals, and interviews with students. The template will outline the steps, questions, and possible tasks necessary for the design of a similar project or module as part of a course in which transcultural knowledge is the objective and the challenge.

References:

Byram, M. (1997). *Teaching and Assessing Intercultural Communicative Competence*. Clevedon: Multilingual Matters.

Byram, M. (2008). *From language education to education for intercultural citizenship*. Clevedon: Multilingual Matters.

Levine, G. (2008) "Exploring Intercultural Communicative Competence through L2 Learners' Intercultural Moments." In A. Schulz & Erwin Tschirner (Eds.), *Communicating across Borders: Developing Intercultural Competence in German as a Foreign Language* (pp. 191-216). Munich: Iudicium.

403 - Strategic Pharmacy Education: A Needs-Driven Model

Roderick Slavcev, School of Pharmacy, University of Waterloo

Jesslyn Tjendra, School of Pharmacy, University of Waterloo

Doris Cheung

Traditional education models are didactic in nature, focusing on teachers instructing students, where transferred knowledge is assessed through tests and passing grades. In contrast, outcome-based education is primarily concerned with demonstrated student learning (outcome) rather than what students are taught (input). Over the past few years, many professional programs such as Law, Accounting, Dental, and Medicine have been under pressure to reform, driven by the critique that traditional education does not adequately prepare students to become practitioners. Educators radically rethink the delivery of professional education by starting at the end and working backwards. One fundamental question often arises: what measures and tools can be used to accurately assess the curriculum and effectively evaluate the results? This on-going study proposes an answer to the question for Pharmacy Education, by exploring and demonstrating a non-traditional model for curricular design and assessment in strategic pharmacy education. It is not intended to be a piece of persuasive advocacy, nor an exhaustive description or analysis, of outcome-based pharmacy education. The model is initiated by a local stakeholder stage for identification of the locally perceived gaps in pharmacy education and training. It then flows through the next two phases and the sub-stages identified within each that comprise the iterative "demand pull" (outcomes) approach to strategic education model. The model also takes into consideration its downstream applications. If the model proves to be as effective and versatile as expected, it will provide an evolutionary framework from which other professions can develop their curricular areas to maintain the most appropriate and relevant programs in Canada. We envision this study to lead to the pioneering of a novel outcomes-based curriculum design and assessment paradigm that may drive the development of a new national standard approach to program design and its ongoing evaluation.

404 - Using Group Work and Peer Instruction to Enhance Students' On-Campus Learning Experience in First Year Physics

Joseph Sanderson, Physics and Astronomy, University of Waterloo

Benji Wales, Physics and Astronomy, University of Waterloo

Mary Power, Centre for Teaching Excellence, University of Waterloo

One of the biggest challenges of university instruction is to blend the traditional virtues of classroom teaching with opportunities provided by modern technology and while including the lessons of teaching research. In addition, the constant growth of online resources and increasing cost of university education continue to call into question the relevance of a conventional university education.

In order to address this we have tried to utilize the instructional potential of one of any university's most important assets, namely its students, in order to try to enhance a live classroom environment. The introductory physics class, without calculus, has two hundred students from diverse programs and backgrounds, traditionally face to face time is dominated by information transfer. We have changed the structure of the course by implemented a system of peer instruction, using groups which exist in both the classroom and online in order to link the two environments. The information transfer aspect of live class has been replaced with online video and notes. Furthermore in order not to overburden the students with an extra time commitment, we have reduced the face to face time by fifty percent. Students prepare for class using the online information and assignments, they then summarize their weeks experience and share it online before class with their group members. This allows classroom time to be dedicated to a combination of peer instruction through short answer clicker questions and group work on context rich problems. Class is followed up by students assessing the contribution of their group members in an online activity and testing their learning with an online quiz.

We will discuss both the pedagogical and technical aspects and make a preliminary assessment of the successes and challenges of the ongoing project, while considering the wider implications of this kind of approach.

405 -Success Mechanisms for STEM Student-Athletes

Adam Neale, Electrical & Computer Engineering, University of Waterloo

Varsity athletics and university science, technology, engineering, and mathematics (STEM) programs are both extremely time intensive commitments. Each requires a considerable amount of discipline and self-motivation on the part of the student. Initially, it would seem that combining these two commitments would be a recipe for disaster, leading to an exhausted, time-crunched student and yield poor performances both in the classroom and on the field. Many students however, continue to prove that concurrent success is possible in both demanding disciplines. At the University of Waterloo, in Ontario, Canada, student-athletes make up approximately 2% of the full-time student population, with approximately 40% of these students enrolled in full-time STEM programs. In this work, 16 undergraduate and graduate students of the university's track and field and cross country teams majoring in STEM programs have been interviewed to discuss their motivation, time management, and coping strategies for successfully navigating life as a STEM student-athlete. Their responses have been analyzed using Eccles' expectancy-value theory as a motivational framework for the students' continued success. The findings of the study suggest that there are many paths leading to success as a student. The study concludes with a series of best practices for success as either a student-athlete or a regular student. This work can be used by educators to gain insight into the STEM student-athlete perspective.

Session 400s: 25 minute sessions: 3:35 – 4:00 pm

406 - Game-Based Learning and Wittgenstein's *Language-Game*

Allison Cattell, Department of Germanic and Slavic Studies, University of Waterloo

This paper contributes to the discussion regarding the use of games to facilitate language learning in Computer-Assisted Language Learning (CALL). Researchers continue to investigate the creation and/or modification of network-based computer games and their effectiveness as language-learning tools. There are many advantages to using such 'games in a limited sense', as shown by Rieber and Noah (2008), Peterson (2010), and Connolly, Stansfield, and Hainey (2011). One of the most consistent findings is that for many learners, using network-based computer games to learn a language is attractive because of their apparent fun, non-real quality; researchers believe this positive perception of fun, non-real contexts for interaction will lead to higher levels of learner achievement. However, as Tarone and Broner (2001) point out, playful language use is not limited to the realm of the non-real; it can be either serious and real, fun and non-real, or display a combination of these characteristics. Against the backdrop of the recent interest in game-based learning, I will argue that the notion of *language-game*

in the philosophy of Ludwig Wittgenstein provides us with a crucial metaphor for rethinking the nature of language, language learners, and language learning. If all language use and interactions are understood as *language-games* that display varying degrees of realness and seriousness, we will be able to overcome the supposed distinction between fun, non-real gaming and serious, real face-to-face communication. Audience members will gain the following from attending the paper: A general overview of the research on games in language education from a CALL perspective; An awareness of the advantages and limitations of using gaming tools, including engaging students and demonstrating the relevance of foreign language learning, and; An understanding of the benefits of teaching language *as game* in addition to teaching language *through games*.

407 - Improving Higher Education in Developing Countries - Egypt

Mohamed Hassan Ahmed, Electrical and Computer Engineering, University of Waterloo

According to educational research, quality teaching is key to effective higher education system. Many governments implemented fundamental changes to the organization of their higher education systems. However, in spite of developments across several nations, there are increasing concerns around the quality of teaching and learning systems that remain stunted within many developing countries, and in particular, in the MENA region (Middle East and North Africa). Egypt provides a compelling example.

Modernizing education in Egypt, i.e. upgrading the educational system to generate and keep pace with the new and up-to-date knowledge and technologies, needs a comprehensive strategy that takes into account the broader context of teaching and learning and the emerging global structures across the world. The purpose of this paper is to investigate the literature on quality of higher education teaching systems in Egypt and to suggest future oriented solutions to the problem of decreasing quality in teaching and learning. The first section of the paper provides a general view of quality teaching and learning throughout the world and a background on the current higher educational system in Egypt. The second section discusses the main challenges facing the Egyptian higher education system. It then suggests short - and long-term solutions, taking into account the challenges of the current situation.

408 Lessons Learned Using Pre-and Post-Tests

Tanya Noël, WatPD, University of Waterloo

When introducing the Waterloo Professional Development program (WatPD), a question that often accompanies “how can you teach students soft skills in an online environment?” is “does the program make a difference?” To answer the second question, the Kirkpatrick model for evaluating training programs was selected as a framework for WatPD’s program evaluation plan. At the second level of this model, the learning level, pre- and post-tests were added to each of the courses as one method of determining how much students learn during the term. Following a brief overview of the WatPD program, the focus of this session will be lessons learned about best practises to follow when designing pre- and post-tests. Proper design decisions ensure appropriate samples are used, reliable and valid questions are asked, and pre-test priming effects are avoided. The session will conclude by sharing examples of ways in which WatPD uses pre- and post-test results to help evaluate students’ learning. This session is recommended for those considering ways to measure student learning in their courses or programs.

409 - The Social Side of Critical Thinking

Tim Kenyon, Philosophy, University of Waterloo

Teaching critical thinking often includes teaching students about the cognitive and social biases to which people are prone (Gilovich 1991, Kenyon 2007). What, exactly, does this accomplish, though? A hidden assumption is that knowing about biases is an effective way of avoiding them. A review of the psychological literature on debiasing shows, however, that it is not generally true. The literature is fairly consistent in its lesson that debiasing tends to be very difficult. Using lessons drawn from work on biases of hindsight and prediction, I argue that there is an unresolved problem in critical thinking education, regarding the difficulty of debiasing by persons

acting alone – even when they are armed with knowledge about the bias, or about debiasing techniques. Indeed, the efforts of individuals to debias may even strengthen the bias in question, rather than remedying it.

So what might work better than just teaching *about* biases? I canvass a range of options holding out some promise of success. What we do know suggests that debiasing works best in local cases, with expert guidance; and that *if* it is teachable as a portable skill that individuals can self-administer, then teaching it will in turn probably involve extensive expert assistance, institutional support, and the inculcation of appropriate attitudes on the part of the learners. This suggests both a practical line of investigation into educational methods, and a point about conceptual taxonomy. The practical aim should be to design and test critical thinking methods that impart skills identified as useful for debiasing in the experimental literature. The more conceptual point is that critical thinking is not a matter of the isolated sceptic resisting falsehoods and fallacies in a social context. Rather, critical thinking itself is an inherently social undertaking of great complexity.

Poster Session: 4:10 pm**Virtual Laboratories in Chemical Engineering Education**

Samira Masoumi, Department of Chemical Engineering, University of Waterloo

The use of online laboratories in educational settings has become more widespread in recent years. Remote and virtual labs are two types of online labs that are used in engineering courses. Remote laboratories allow web-based access to real lab facilities. Hands-on experiments cannot be replaced by online experiments but they are beneficial in distance learning and situations which flexible time and access location is desired. Depending to the nature of the experiments some safety control and supervision may be needed when the access to the equipment is available. Due to safety concerns in most of chemical engineering experiments, applications of remote labs are less reported in this field than the other engineering fields.

Unlike remote labs, virtual labs are based only on computer simulation and are not attached to actual physical facilities. Virtual labs can be used as a complementary learning tool to support physical lab. For instance, web-based interactive lab manuals can be designed and used instead of the traditional manuals [1]. These provide the opportunity of better preparation prior to attending the real lab. Moreover, extra experiments can be held using virtual lab after the real experiment to investigate more about the system. Virtual labs can represent independent laboratories.

In this study an independent virtual lab is designed and implemented using the code generator software easy java simulation (ESJ) [2] for the purpose of teaching the experimental design in the statistic in engineering course at the University of Waterloo. The designed virtual lab consists of a simulated chemical reactor which allows students to change its parameters in order to investigate their effect on output. Finally more applications for virtual labs in chemical engineering department at the University of Waterloo are suggested.

1. Lee, H., 2002. Comparison between traditional and web-based interactive manuals for laboratory-based subjects, *International Journal of Mechanical Engineering Education* 30(4), 307-314.
2. Sánchez, J., Esquembre, F., Martín, C., Dormido, S., Dormido-Canto, S., Canto, R., Pastor, R., Urquia, A., 2005. Easy Java simulations: An open-source tool to develop interactive virtual laboratories using MATLAB/Simulink, *International Journal of Engineering Education* 21(5), 798.

Using Visual Aids in Teaching

Tiffany C. Inglis, Computer Science, University of Waterloo

Students have different learning styles and different types of intelligences. Many students identify as visual learners because they prefer the use of visual aids and believe that they learn most effectively when the information is presented in a visual rather than auditory or kinesthetic format. An experiment conducted by Kollöffel shows that students' preference for learning styles is uncorrelated with their performance, suggesting that letting students choose how they learn may not be the most effective teaching method. However, Dobson's study on comparing learning style preferences to sex, status, and course performance showed that students perform better when they were allowed to choose their learning method. Dobson also discovered that while many students identify as visual learners, they perform better in a multimedia learning environment in which information is presented through various media.

Since multimedia learning is shown to be the most effective, we look at different ways to incorporate it into classroom learning. When using corresponding text and images, it is important not to overload the students with too much information and reduce their visuo-spatial working memory. According to the split-attention principle discussed by Ayres and Sweller, the text and images should be placed close together and presented

simultaneously. Plass and Blake discovered that students with low visual-preference learned better from slides with audio narration while those with high visual-preference performed better from instructional videos. Ozcelik et al. showed that colour-coding helps students with information retention because it is easier to match corresponding parts and locate important information. Chun et al. experimented with multimedia learning in second-language German class and found that students memorized new vocabulary more efficiently when presented with both visual aids and verbal annotations.

This poster begins by describing different learning styles and types of intelligences. Then it answers several questions involving visual aids such as their effectiveness, how to best use them, how to integrate them with other media, etc. The questions and answers will be in the form of thought bubbles surrounding a person who represents a visual learner.

AYRES, P., AND SWELLER, J. 2005. The split-attention principle in multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning*. New York: Cambridge University Press. 135–158.

DOBSON, J. L. 2011. A comparison between learning style preferences and sex, status, and course performance. *Advances in Physiology Education* 34, 4, 197–204.

GARDNER, H. E. 1993. *Multiple Intelligences: The Theory In Practice*. Basic Books.

HOMER, B. D., PLASS, J. L., AND BLAKE, L. 2008. The effects of video on cognitive load and social presence in multimedia-learning. *Computers in Human Behavior* 24, 3 (May), 786–797.

KOLLÖFFEL, B. 2012. Exploring the relation between visualizer-verbalizer cognitive styles and performance with visual or verbal learning material. *Computers & Education* 58, 2, 697–706.

OZCELIK, E., KARAKUS, T., KURSUN, E., AND CAGILTAY, K. 2009. An eye-tracking study of how color coding affects multimedia learning. *Computers & Education* 53, 2, 445 – 453.

PICKERING, S. J. 2001. The development of visuo-spatial working memory. *Memory* 9, 4-6, 423–432.

Extending Hospital-Based Medication Incident Reporting to Continuous Quality Assurance in Community Pharmacy Practice and Undergraduate Pharmacy Training

Certina Ho, School of Pharmacy, University of Waterloo

Roger Cheng, Institute for Safe Medication Practices Canada (ISMP Canada)

Calvin Poon, School of Pharmacy, University of Waterloo

Objectives:

Medication system safety is a continuous quality improvement cycle, which starts with medication incident reporting. Medication incidents are subsequently analyzed in order to identify vulnerable practices where solutions can be implemented. Medication system safety is a relatively new concept in community pharmacy practice when compared to other health care settings in Canada. This stems in part from the lack of a medication incident reporting and learning program designed for community pharmacies.

The Institute for Safe Medication Practices Canada (ISMP Canada) (<http://www.ismp-canada.org>) is a non-for-profit national organization that advocates for the safe use of medications. Based on experience acquired from hospital-based incident reporting, the ISMP Canada Community Pharmacy Incident Reporting (CPhIR) program (<http://www.cphir.ca>) was designed specifically to provide opportunities to optimize learning from past mistakes in community pharmacies. At the School of Pharmacy, University of Waterloo (UW), the CPhIR program is used by students for documentation of medication incidents in their training sessions. The goal is to provide students with practical experiences in incident reporting, which can be incorporated into their global understanding of medication system safety.

Method:

CPhIR allows individual pharmacies to perform medication incident analysis, monitor trends, and to view the national aggregate. Pharmacy students analyze their own incident reports captured at their training and develop solutions to prevent the same errors from happening again.

Results:

There are over 300 registered CPhIR users in Canada. Since CPhIR's official launch in April 2010, over 24,000 medication incidents have been anonymously reported to ISMP Canada. Similar to UW, students at the College of Pharmacy, Dalhousie University, are also using the CPhIR program for tracking and analyzing medication errors during their undergraduate training.

Implications:

It is anticipated that CPhIR will be used by all community pharmacies for medication incident reporting and analysis across Canada. Initiating a blame-free culture of medication incident reporting and learning at the undergraduate level should be promoted and adopted in other schools of pharmacy across Canada.

Development of a Progress Index in an Undergraduate Nursing Program

Terry McCurdy, School of Nursing, McMaster University

Sarah Haliburton, Mandy Thornton, Cassandra Wintle, Emily Gibbs, School of Nursing, McMaster University

Eileen Hanna, Nancy Sinclair, School of Nursing, McMaster University

The Personal Progress Index (PPI) has been used at the McMaster Medical School since 1992. The PPI was created in response to greater failure rates on national licensing examinations among medical students from our problem-based learning (PBL) program versus students from conventional medical programs (Blake *et al.*, 1996). The test was designed to provide assessment and feedback to students without altering the deeper learning style engendered by the PBL method of education. Graduates of medical school PBL programs have been judged to have better clinical skills (Vernon & Blake, 1993), while nursing PBL students exhibited greater critical thinking (Tiwari *et al.*, 2006). Both groups reported greater satisfaction with their PBL learning environment versus learners in traditional programs (Vernon & Blake, 1993, Rideout *et al.*, 2002). However, PBL medical school students' performance on standardized tests has been consistently lower than their counterparts from traditional programs (Vernon & Blake, 1993). Knowledge acquisition and national registration examination pass rates are presently a concern with PBL nursing students as they were previously with medical students and their licensing examination (Rideout *et al.*, 2002).

To address these concerns we are in the process of designing a progress index for McMaster University nursing students. This poster will provide details on instrument design such as the knowledge domains we plan on including as well as the logistics of test administration and measurement of efficacy. We will examine how success is currently being measured in PBL-style programs and the effects of this type of learning on licensing exam pass rates. We will also focus on how progress testing is being used in other healthcare-related fields and the evidence for effectiveness of PPI-type instruments.

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Rideout, E., England-Oxford, V., Brown, B., Fothergill-Bourbonnais, F., Ingram, C., Benson, G., Ross, M., Coates, A. (2002). A comparison of problem-based and conventional curricula in nursing education. *Advances in Health Science Education*, 7, 3-17.

Tiwari, A., Lai, P., So, M., & Yuen, K. (2006). A comparison of the effects of problem-based learning and lecturing on the development of students' critical thinking. *Medical Education*, 40, 547-554

Vernon, D.T., Blake, R.L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine*, 68, 550-563.

Promoting Intentional Learning through Social Media

Mihaela Vlasea, Mechanical and Mechatronics Engineering, University of Waterloo

The phenomenon of online communities manifested through social media is rapidly expanding to encompass not only the social, but also the professional and academic aspects of everyday life. A new generation of dynamic learners is emerging, whose needs may no longer be met through conventional teaching methods. In the age of information and technology, it is important to investigate new avenues by examining the feasibility of adapting higher education to a new environment, which can stimulate intentional learning through the use of social media. There is a vast opportunity to integrate learning within the context of online communities, where some of the major educational tools such as engagement, feedback and access to information are already common practice. This work focuses on determining the benefits and drawbacks of integrating social media as a teaching and intentional learning tool in the context of higher education. Ideas on how this approach could be successfully integrated will be discussed by investigating the most important ingredients to implementation of social media interaction as a teaching and learning tool.

A Multi-Tiered Qualitative Analysis of Student Learning in a Unique Community Service Learning Program

Nancy M. Waite, School of Pharmacy, University of Waterloo

Katie Cook, School of Pharmacy, University of Waterloo

Anita Abraham, Social Innovation Generation, University of Waterloo

Objectives/Intent:

Community service-learning (CSL) is embedded in many pharmacy programs and student learning has been measured through student and course assessments. However, few have taken a qualitative approach to analyze student artifacts and triangulate research findings across different assessment activities. At the University of Waterloo School of Pharmacy (UWSOP) investigation of how best to give back to the local community (who had donated \$30 million to start the School) resulted in the "Pharmacy innovation Garden: planting ideas, growing change in our community" project.

Methods/process:

This 4-year initiative saw 500+ students, as part of their required curriculum, partnered with ~30 community agencies on agency-generated capacity building 6 month projects. With the majority of agencies not having a health care focus, the question was raised whether student learning would still add value to the curriculum. A qualitative analysis was conducted of a subset of student reflection papers with secondary triangulation to other student generated data such as group reflections, pre/post surveys and course evaluations.

Results/outcomes:

Main findings included individual skill and professional identity development, and greater community understanding. Almost 50% discussed developing understanding of the strengths and needs of the community and 63% reflected upon the way in which a community functions and how it can impact health. Students' evolving professional identities were informed/broadened to include becoming a community-engaged professional. Comparison of research findings to UWSOP graduating-student outcomes, reveals a strong match with both professional and patient care outcomes.

Implications:

CSL plays a key role in developing professionalism and community awareness among UWSOP students.