Keynote presentation 8:45-10:00

Scholarship of Teaching and Learning: You're Already Doing It!
Catherine Wehlburg, Assistant Provost for Institutional Effectiveness at Texas Christian University

Many post-secondary educators who are thinking about doing research on teaching and learning are dissuaded from doing so by the perceived extra work such research would entail. However, Dr. Wehlburg argues that this perception is misguided. If teaching, learning and student assessment are happening in your classroom (and they are!), then you've already done most of the work needed to be a scholar of teaching and learning. So why not take advantage of it? This engaging and interactive workshop will help participants develop the strategies they need to parlay course prep and assessment time into powerful "scholarship of teaching and learning" results.

Session 100 10:30-11:20 (50 minutes)

101
Title By Hand or Keystroke? An Examination of Student Note-Taking Effectiveness
Ruth Rodgers and Maureen Wideman, Centre for Academic Excellence and Innovation, Durham College/UOIT

This presentation will present the findings of a mixed method research project conducted with UOIT students in the spring of 2009. The research explored qualitative differences between lecture notes taken by hand and those taken by laptop computer. While the results of grading the notes using a rubric showed low inter-rater reliability, within-rater analysis reveals some differences in the quality of digital vs. handwritten notes. The findings suggest that both note-taking formats are valuable, depending upon the material being presented, and the student him/herself. This may suggest that students should be allowed choice in terms of their preferred approach to note-taking. The session will present our research design, results and analysis, and plans for future research. During the session, participants will be asked to take notes via laptop (or other digital device) or by hand. In the latter part of the session, participants will pair up to compare the quantity and quality of the notes taken in the two formats, and extrapolate the possible reasons for any differences observed. As well, an open discussion about the limitations of this study and the potential for follow-up research will be facilitated.

Katayama, A. D. (2005). Promoting knowledge transfer with electronic note taking. *Computers in Teaching, 32*(2), 129-131.
Kobayashi, K. (2006). Combined effects of note-taking/reviewing on learning and the enhancement through interventions: A meta-analytic review. *Educational Psychology, 26*(3), 459-477.
Peverly, S. T., Ramaswamy, V., Brown, C., Sumowski, J, & Alidoost, M. (2007). What predicts skill in lecture note taking? *Journal of Educational Psychology, 99*(1), 167-180.

102
E-portfolios and Chickering and Gamson's Seven Principles for Good Practice in Undergraduate Education
Katherine Lithgow, Centre for Teaching Excellence, University of Waterloo

Chickering & Gamson (1987) presented the *Seven Principles for Good Practice in Undergraduate Education:* good practice "encourages contact between students and faculty", "develops reciprocity and cooperation among students", "encourages active learning", "gives prompt feedback", "emphasizes time on task", "communicates high expectations" and "respects diverse talents and ways of learning." More than twenty years later, implementing the *Seven Principles* often remains a challenge as Higher Education attempts to focus on student-centred active learning, student reflection, and the development of meta-cognitive skills in addition to addressing the influence of digital communication technologies, the demands for accountability (e.g. UDLEs) and a rising fluidity between employment and education. These forces have led to an increased interest in the use of e-portfolios as an option for dealing with these challenges. During the session, we'll review feedback received from students, and using the *Seven Principles* as a guide, participants will discuss the advantages and challenges associated with using e-portfolios. At the end of the session,

participants will have a better understanding of how e-portfolios can help address some of the challenges facing Higher Education today, and future possibilities for research in this area.

Barrett, H. (2005). White paper: Researching electronic portfolios and learner engagement. *The Reflect Initiative.* Retrieved April 2, 2009 from http://www.taskstream.com/reflect/whitepaper.pdf

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *The American Association for Higher Education Bulletin*, March. Retrieved March 23, 2009 from http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/7princip.htm

Clark, J. E., & Eynon, B. (2009). E-portfolios at 2.0-Surveying the field. *AAC&U Peer Review*, *11 (1)*. Retrieved September 2, 2009 from http://www.aacu.org/peerreview/pr-wi09/pr-wi09_eportfolios.cfm

Miller, R., & Morgaine, W. (2009). The benefits of e-portfolios for students and faculty in their own words. *AAC&U Peer Review*, *11 (1)*. Retrieved September 2, 2009 from http://www.aacu.org/peerreview/pr-wi09/pr-wi09_benefits.cfm

103

Models and Experiences in the Development of Graduate Student Leadership

Michael K. Potter, Centre for Teaching and Learning, University of Windsor
Betsy Keating, Faculty of Education, University of Windsor

There are multiple models for the development of graduate students as educational leaders: effective teachers able to facilitate the educational development of their colleagues and create new educational initiatives for their departments. In this session, we will present and critically compare five models of graduate student development programs: educational leadership awards, decentralized educational development networks, learning communities, induction events, and teaching certificate programs. Each model will be related to the educational development literature as well as our experiences as participants and leaders. Participants will be invited to share their own experiences with these models, assesses their comparative strengths and weaknesses, and explore how they could adopt models to meet the needs of their own campus communities. Through a variety of written exercises and small-group discussions, participants will gain a better appreciation of the possibilities and limitations presented by each model, to aid in the planning of their own graduate student leadership initiatives.

Brew, A and Ginns, P. (2008). The relationship between engagement in the scholarship of teaching and learning and students' course experiences. *Assessment and Evaluation in Higher Education*, *33*(5), 535-545.

Schönwetter, D. J., Ellis, D. E., Taylor, K. L., & Koop, V. (2008). An exploration of graduate courses on college and university teaching in Canada and the USA. *The Journal of Graduate & Professional Student Development*, *11*(1), 7-29.

Taylor, K. L., Schönwetter, D. J., Ellis, D. E., & Roberts, M. (2008). An approach to evaluating the impact of two certification in university teaching programs for graduate students. *The Journal of Graduate & Professional Student Development*, *11*(1), 78-108.

104

Expert Test Questions for Neophyte Learners

Michele Heng, Systems Design Engineering, University of Waterloo
Gordon Stubley, Mechanical and Mechatronics Engineering, University of Waterloo
Kaan Erkorkmaz, Mechanical and Mechatronics Engineering, University of Waterloo
Jan Huissoon, Mechanical and Mechatronics Engineering, University of Waterloo
Bill Owen, Mechanical and Mechatronics Engineering, University of Waterloo
Soo Jean, Mechanical and Mechatronics Engineering, University of Waterloo
Steven Waslander, Mechanical and Mechatronics Engineering, University of Waterloo

Concept inventories or diagnostic tests administered at the start (pre) and end (post) of foundation science and engineering courses are well established [1,2,3] tools for measuring conceptual growth. For foundation courses students have sufficient background knowledge to make the test questions meaningful in the pre-instruction phase. However, for advanced introductory courses most students are neophytes and it is a challenge to make test questions meaningful for

the pre-instruction phase. This research contributes to the development of a diagnostic test for an advanced introductory course, control system theory.

Control system theory involves the analysis and design of systems like automobile cruise control systems. This course has two learning challenges common to many advanced subjects: the use of interdisciplinary background knowledge and the use of abstract analysis techniques. Participants in this session will act as neophyte learners by completing several types of test questions and reflect on their reactions to the various question types. We will review our experience gained from the development of a diagnostic test and provide guidelines for formulating meaningful pre-instruction questions for neophytes. To conclude, we will discuss possible future research in this area.

Halloun, I. A., & Hestenes, D. (1985). The initial knowledge state of college physics students. *American Journal of Physics, 53*, 1043-1056.

Hestenes, D., Wells, M., & Swackhamer, G. (1992).Force concept inventory. *The Physics Teacher*, 30, 141-158.

Wage, K. E., Buck, J. R., Welch, T. B., & Wright, C. H. G. (2000). Testing and validation of the signals and systems concept inventory. *Proceedings of the lEEE Signal Processing Education Workshop,* Pine Mountain, GA.

Session 200 11:30-11:55 (25 min)

201

From the Periphery to the Spotlight: Assessing the Effectiveness of Writing Services

Theresa Hyland, Writing and Cross-cultural Services, Huron University College
Grace Howell, Writing and Cross-cultural Services, Huron University College

Pemberton (2003) argues that because there are so many variables involved in any student's improvement in writing, assessing the growth of students' self-efficacy beliefs is the best way for writing centres to provide evidence of their link to students' improvements in writing. This paper reports the results of our study exploring the effectiveness of writing services in helping students become better writers. Bearing in mind Bell's (2000) call for rigorous methods of evaluation, we measured students' development of good writing skills using three sources of data: (1) the Writing Proficiency Assessment as a pre- and post-test measure of writing improvement between 1st and 4th years (2) data about students' performance in writing in their essay courses (3) written survey and follow-up interviews with the students. The results show a complex relationship between the roles feedback from professors, feedback on the WPA, and use of the Writing Skills Centre play in the development of students' writing skills. While evidence from this study may be insufficient to prove a causal link between Writing Services and writing skills' development, it does indicate where patterns of behavior seem to promote that development.

Bell, J. H. (2000). When hard questions are asked : Evaluating writing centers. *The Writing Center Journal, 21*(1), 7-28.

Clary-Lemon, J. (2009). Shifting tradition: Writing research in Canada. *American Review of Canadian Studies, 39*(2), 94-111.

Jones, C. (2001). The relationship between writing centers and improvement in writing ability: An assessment of the literature. *Education, 122*(1), 3-20.

Pemberton, M. A. (2003). The writing lab newsletter as history. In M. A. Pemberton, & J. Kinkead (Eds.), *The center will hold: Critical perspectives on writing centre scholarship* (pp. 21-35). Logan, UT: Utah State University Press.

202

Faculty Engagement in Teaching in Six Ontario Universities

Fred Evers, Teaching Support Services, University of Guelph
Shirley Hall, Teaching Support Services, University of Guelph

The objective of this session is to describe the results of a research study on faculty engagement in teaching at six Ontario universities. The focus will be on how faculty first learned how to teach and how they developed their teaching over time. We will look at the impact of teaching and learning centres and other sources on faculty engagement. Brookfield's (1995) four lenses (self, colleagues, students, and theory) to view faculty development in teaching are used

in the analysis. We also look at how teaching has evolved from a teacher-centred approach to a learner-centred approach (Akerlind, 2007). Focus groups (N=75) and on-line surveys (N=876) were used to collect the data. Key findings that the participants will take away include (1) self-reflection was critical for development, (2) most faculty still lack formal training in teaching, and (3) the dominance of research over teaching within the academy drew even award winning teachers away from having teaching as the focus of their work.

Akerlind, G. S. (2007). Constraints on academics' potential for developing as a teacher. *Studies in Higher Education, 32*(1), 21.
Brookfield, S. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.

203

A Stakeholder-conscious and Outcomes-based Approach to the Development of a Pharmacy Business Curriculum

Mary Power, Centre for Teaching Excellence, University of Waterloo
Roderick Slavcev, School of Pharmacy, University of Waterloo

The Canadian Association of Chain Drug Stores (CACDS), believe that the essential business and managements skills that pharmacists require in order to become managers and/or owners is not adequately imparted by current pharmacy curricula even though time-use studies indicate that a significant portion of a pharmacist's time is devoted to these functions (Koleba et al. 2006). To address this curricular short-coming we have developed and are in the process of implementing an iterative outcomes based approach (Ho et al., 2009) in the layout of our business curriculum. We will present the curriculum template created as an outcome of a stakeholder workshop and ongoing discussion with industry experts. A continuing assessment plan that has been designed to ensure that the business curriculum maintains relevance in a dynamic professional environment will be discussed. We will demonstrate that this model of curriculum design and scrutiny has a broad application across disciplines and will outline possibilities for future research.

Koleba, T., Marin, & Jewesson, P. (2006). Entry-level PharmD degree programs in Canada: Some facts and stakeholder opinions. *CPJ/CRJ 139*, 42-50.
Ho, S., Kember, D., Lau, C., Au Yeung, M., Leung, D., & Chow, M. (2009). An outcomes-based approach to curriculum development in pharmacy. *American Journal of Pharmacy Education, 73*(1), Article 14.

204

Teaching By Dialogue in the Liberal Arts

John Greenwood, Human Sciences, St Jerome's University

The paper argues the suitability and effectiveness of Socratic teaching in the Liberal Arts. An historical perspective connects the modern movement in dialogical teaching to Socrates himself and reasons the usefulness of both individual awareness - 'know yourself' - and confidence in the ethical, or interrelational, pursuit of knowledge as advantages of the method over passive responses to the conventional lecture. Modern paradigms (Nelson, 1949; Heckmann, 2004; Friere, 1970; Vella, 2008) are related to current practice. St Jerome's Foundation Year Program and Human Sciences initiative - a Liberal Arts curriculum focusing on core texts, dialogue format and contemporary issues - are considered as exemplifications of the method. Evidence and demonstration of the model's current success are consistent student survey responses that highlight five themes: 1) engagement/commitment, 2) integrative learning, 3) openness/participation, 4)aporia (Socratic perplexity), and 5) teacher as model. The St Jerome's example also demonstrates the use of dialogue or debate as both method and content. Attendees can expect to take away an awareness of the potential effectiveness of the method for application in their own teaching and research.

Nelson, L. (1949). The Socratic Method. In *Socratic method and critical philosophy: selected essays.* London: Dover.
Freire, P. (1970). *Pedagogy of the oppressed*, trans. Myra Bergman Ramos. Chestnut Ridge, NY: Herder & Herder.
Heckmann, G. (2004). Six pedagogical measures and socratic facilitation. In R. Saran, & B. Neisser (Eds.), *Enquiring Minds: Socratic dialogue and education* (pp. 107-120). Stoke-on-Trent, Staffordshire: Trentham Books.
Vella, J. (2008). *On Teaching and Learning: putting the principles and practices of dialogue teaching into action.* San Francisco: Jossey-Bass.

Session 300 1:30-2:25 (50 min or 2 x 25 min with 5 min break)

301 (50 min)

Effective Utilization of Students' Mobile Devices for Interactive Learning in the Classroom: A Case Study in Organic Chemistry

Mohsen Shahini, *Department of Mechanical and Mechatronics engineering, University of Waterloo*
Steven Forsey, *Department of Chemistry, University of Waterloo*
Olivier Nguon, *Department of Chemistry, University of Waterloo*
William Melek, *Department of Mechanical and Mechatronics engineering, University of Waterloo*

It has been verified that students better understand concepts and are better able to solve novel problems after going through computer simulations (Finkelstein et al, 2004; Kumar & Sherwood, 2007). Moreover, experiential learning (Kolb, 1975) can be realized in the classroom by allowing each student to individually explore simulations after a key concept is introduced in the lecture. Recently, the widespread use of mobile computers among students has significantly facilitated incorporation of an interactive computer-assisted teaching in the lectures.

The objective of this session is to demonstrate how integrating novel computer-based interactive teaching enhances student learning in the classroom. Results from incorporating the proposed methodology in an organic chemistry course at UW will be discussed with respect to student learning. Workshop participants will be provided with an interactive device to engage with the materials presented in the workshop in a manner similar to the interactive classroom environment. Participants will observe how the system can be used in the class and how the learners can benefit from the proposed methodology. Ideas for further research will be discussed.

Finkelstein N. D., Perkins K. K., Adams W., Kohl P., & Podolefsky N. (2004). *Can computer simulations replace real equipment in undergraduate Laboratories?* Paper presented at the American Institute of Physics Conference, Sacramento, California, August 4–5.

Kumar, D. D., & Sherwood, R. D. (2007). Effect of a problem based simulations on the conceptual understanding of undergraduate science education students. *Journal of Science Education and Technology, 16*(3), 239–246.

Kolb. D. A. and Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.) *Theories of group processes*. London: John Wiley

302 (50 min)

The Use of Critical Self-Reflection in Teaching and Learning

Toni Serafini, Sexuality, Marriage & Family Studies, St. Jerome's University
Carm De Santis, Sexuality, Marriage & Family Studies, St. Jerome's University

Critical self-reflection is a fundamental process of transformative learning (Cranton, 2006; Mezirow, 1991; Taylor 2007) that invites learners to engage in a process of questioning assumptions, values, and perspectives they encounter in their world (Mezirow, 2000), thereby encouraging self-knowledge and empowerment for the learner (Cranton, 2006). This session will present results of an initial inquiry into student perceptions regarding the definition and practice of critical self reflection in undergraduate courses, collected via an online survey. Working independently and in small groups, attendees will "try out" some of the activities identified by students as fostering a critical self-reflective engagement in the learning process. Attendees will also engage in critical discussion about how results of this study can be applied to curriculum/course planning, and what further research in this area could/should entail.

Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults (2nd ed.)*. San Francisco: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress.* San Francisco: Jossey Bass.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.

Taylor, E. W. (2007). An update of transformative learning theory: A critical review of the empirical research (1999-2005). *International Journal of Lifelong Education, 26,* 173-191.

303A (25 min)

Student driven development of a multi-media learning tool

Jane Holbrook, *Centre for Teaching Excellence, University of Waterloo*
Andrea Edginton, *School of Pharmacy, University of Waterloo*
Mary Power, *Centre for Teaching Excellence, University of Waterloo*

Better learning outcomes for students and increased access and flexibility in the time, pace and place of learning are often cited as the strengths of blended courses (Dziuban et al., 2004; Garrison& Kanuka, 2004). Our research also indicates that student enthusiasm for a blended method of course delivery increased significantly between the beginning and the end of the 'Pharmacokinetics' section of a second year Pharmacy course (Edginton & Holbrook, 2010). Our research instrument was modified this year to gather feedback from another cohort of students about a different, lecture-based section of this course, 'Clinical Biochemistry'. This student feedback has driven the development of an online virtual field trip that incorporates real-world applications and integrates both online and in-class learning activities. Participants will see the results of our pre- and post-course questionnaires for the past two years and our development of the virtual field trip. Our experience implementing this research to the design of the learning tool will be helpful to participants who are interested in researching blended approaches to teaching and learning.

Dziuban C. D., Hartman J. L., & Moskal, P.D. (2004). *Blended learning.* Educause Center for Applied Research, Research Bulletin, 7. Available from: http://www.educause.edu/ir/library/pdf/ERB0407.pdf.

Edginton, A., & Holbrook, J. (in press). Assessment of student attitudes to learning basic pharmacokinetics through a blended approach and the significance of face-to-face interaction. *American Journal of Pharmaceutical Education*.

Garrison D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *Internet and Higher Education, 7*, 95-105.

303B (25 min)

Knowledge Exchange between Experiential Learning and Classroom Teaching of Pharmacy Students

Certina Ho, School of Pharmacy, University of Waterloo & Institute for Safe Medication Practices Canada (ISMP Canada)
Nancy Waite, School of Pharmacy, University of Waterloo
Sheri Howard, School of Pharmacy, University of Waterloo
Patricia Hung, School of Pharmacy, University of Waterloo & Institute for Safe Medication Practices Canada (ISMP Canada)

Medication Safety Self-Assessment® (MSSA) (2006) is a questionnaire used to assess medication safety in pharmacy practice settings. Undergraduate pharmacy students were introduced to the MSSA tool in class at a previous academic term. During co-op, with the employers' consent, students conducted MSSA at their drug distribution work placements. Aggregate MSSA results were presented to students in class at a subsequent academic term. In class, students studied the findings and trends derived from the MSSA results. They were then assigned to work as a team to offer quality improvement recommendations back to their employers.

Hayward, Blackmer, and Raelin (2007) examined the use of reflection to augment student's learning during co-op. Similarly, at the school of pharmacy, students demonstrated improved ability to adopt existing knowledge in medication safety to their workplace encounter through self-reflection and in-class discussion. We will discuss the ways in which co-op students can serve as a liaison between the academic and the "real" world by offering state-of-the-art knowledge exchange between the school and their employers, along with possibilities for future research in this area.

Hayward, L., Blackmer, B., & Raelin, J. (2007). Teaching students a process of reflection: a model for increasing practice-based learning outcomes during cooperative education. *Journal of Cooperative Education Internships*, *41*, 35-47.

Medication Safety Self-Assessment® for community/ambulatory pharmacy (Canadian Version). (2006). Toronto, Ontario: Institute for Safe Medication Practices Canada.

304A (25 min)

Enhancing Language Awareness – The Key to Language Learning Success

Barbara Schmenk, Department of Germanic and Slavic Studies, University of Waterloo
Mathias Schulze, Department of Germanic and Slavic Studies, University of Waterloo

Language awareness (Hawkins, 1999; James and Garrett, 1991) has become an important goal of language instruction, both in first and second language learning. Language awareness is an umbrella term that covers areas such as structures as well as discourse features and cultural and communicative patterns of language use. Specifically, we will discuss selected pedagogic approaches aimed at raising the language awareness of students of German at UW. In a set of learning tasks, students will have access to selected electronic corpora – structured collections of texts – and they will engage with the language material more extensively and thoroughly than through the exclusive use of textbook materials (Yoon, 2008). We hypothesize that increased language awareness will lead to deeper engagement and thus to more effective learning.

In this presentation, we will discuss aspects of the learning design, task conceptualization, and the appropriate learning resources. These examples are taken from a German-language course, but the general principles are applicable to research areas such as the teaching of other languages as a foreign or second language and textual analysis in areas such as literature, philosophy, and linguistics.

Hawkins (1999).Foreign language study and language awareness. *Language Awareness, 8 (3&4),* 124-142.
Carl, J., & Garrett, P. (1991). *Language awareness in the classroom*. New York: Longman.
Yoon, H. (2008). More than a linguistic reference: The influence of corpus technology on L2 academic writing. *Language Learning & Technology, 12*(2), 31-48.

304B (25 min)

Teaching Effective Strategies Using the Academic Word List (AWL): Leading Second Language Learners to Academic Success

Maggie Heeney, English Language Institute, Renison University College

For ESL learners, there is a direct link between vocabulary acquisition and academic success While English-speaking undergraduates have a receptive knowledge of 14,000-17000 words, ESL learners need a minimum knowledge of 10,000 words in order to understand 95% of non-specialized academic text (Hulstijn, 2001). However, lack of vocabulary challenges most ESL undergraduates (Gould, Nation & Read, 1990). Coxhead (2000) suggests rich knowledge of the Academic Word List (AWL) builds vocabulary, thereby increasing the likelihood for academic success. Furthermore, deep information processing and elaborate, deliberate practice helps automatize vocabulary (Hulstijn, 2001). This 10-week class-room research examines the teaching of strategies that deepen as well as broaden vocabulary acquisition and how these strategies facilitate reading comprehension and writing ability. Observations of strategies taught and practiced include analysis of word parts, use of collocations, and development of word families within the AWL. Interviews with the instructor and students reveal a perception that intensified practice of vocabulary strategies facilitates reading and writing expertise. This study may give insights to educators in any discipline as to the importance of developing academic vocabulary strategies. Possibilities for future research will be highlighted.

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, *34*(2), 213-238.
Gould, R., Nation, P., & Read, J. (1990). How large can a receptive vocabulary be*? Applied Linguistics,11*,341-363.
Hulstijn, J. (2001). Intentional and incidental second-language vocabulary learning: A reappraisal of elaboration, rehearsal and automaticity. In P. Robinson (Ed.). *Cognition and Second Language Instruction.* (pp.258-286). New York: Cambridge University Press.

Session 400 2:35-3:00 (25 minutes)

401

The Use of Transformative Learning Experiences in Business School Education

Teal McAteer, DeGroote School of Business, McMaster University

A Transformative Learning Experience (TLE) occurs when individuals critically evaluate long-held assumptions and beliefs and consciously accept "new ways of defining their worlds" (Mezirow, 1997, 2000). According to Mezirow (1997), transformative learning is catalyzed by a "disorienting dilemma" (p.7). Kets de Vries and Korotov (2007) provide evidence that there is a deficiency in using TLE methods in Masters and Executive Business School education despite the documented demand, as well as a need to study TLE impacts on students. This paper describes how a Canadian University's Business School has successfully embedded a TLE within two MBA courses. The Leadership course incorporates a six-week TLE whereby students receive shocking results from several diagnostics, followed by reflection, reframing and action. The Change Management course's TLE involves a simulated "firing" of students. Data collected from student journals and reaction measures, both show the experience to be a beneficial and thought-provoking teaching and learning tool. Student descriptors include "life-altering", "confidence building", "profound growth experience", and "absolutely necessary". Session participants will learn how to integrate a TLE into academic and practitioner based courses and training programs and will consider future research in this area.

Kets de Vries, M., & Korotov, K. (2007). Creating transformational executive education programs. *Learning and Education Journal, Academy of Management*, *6*(3).

Mezirow, J. (1997). Transformative learning: Theory to practice. *Transformative Learning in Action: Insights from Practice. New Directions for Adult Learning in Action and Continuing Education*, *74*, 5-12, San Francisco, CA: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Fancisco, CA: Jossey-Bass.

402

After the Last Exam: International Students Talk about Their Co-Op Experiences

Svitlana Taraban-Gordon and Mark Morton

Extensive research on international undergraduate students offers much insight into the academic and social experiences and challenges faced by those students during their studies in western universities. However, with the exception of one study (Paku & Coll, 2008), little is known about the experiences of international students enrolled in co-operative education programs such as that offered at the University of Waterloo. This presentation discusses the findings of a recent study on the experiences of international students in Waterloo's co-op programs. Drawing on data collected in 2008-09 through web-based surveys and focus groups, we will discuss the culturally embedded challenges that shape the experience of these students, as well as the suggestions that students make to assist with their transition from the classroom to the workplace.

Paku, L., & Coll, R. (2008). Perceptions of the co-op experience for international full-fee paying students. *Journal of Cooperative Education and Internships*, *41*(1), 105-116.

403

Building Interprofessional Education Strategies and Collaborations within the Social Sciences

Kevin Donald Willison, Department of Sociology and, the Department of Interdisciplinary Studies, Lakehead University

This in-progress original review considers the rich potential that exists towards integrating interprofessional education (IPE) strategies within the social sciences. IPE is defined here as a process by which a group of students/learners from varied disciplines may learn with, from and about each other to improve collaboration. Through this, students are better enabled to think critically and inquire about the nature of systems of knowledge. While IPE initiatives are often funded and deployed to improve interdisciplinary team-work and learning within the health sciences (see refs), IPE for the social sciences appears to be all too often ignored or, viewed as inappropriate. In this session, we will (a) describe what interprofessional education is and what it entails; (b) point out some of the barriers that exist towards incorporating IPE within the social sciences; and (c) consider opportunities and new directions in general that IPE could bring to all disciplines.

IPE Ontario (2009). *Ontario Inter-professional Health Collaborative* (conference). University of Toronto Conference Centre, January 18-20.
Stone N. (2006). Evaluating interprofessional education: The tautological need for interdisciplinary approaches. *Journal of Interprofessional Care, 20*(3), 260-275.
Lumague, M., Morgan, A., Mak, D., Hanna, M., Kwong, J., Cameron, C., Zener, D., & Sinclair, L. (2006). Interprofessional education: The student perspective. *Journal of Interprofessional Care, 20*(3), 246-253.

404

Knowledge Surveys: Self-Assessment of Undergraduate International Development Students for Teaching and Learning Innovation

Laxmi Prasad Pant, International Development Program & Enterprise and Development, Faculty of Environment, University of Waterloo

Educational needs assessment at the post-secondary level is an ongoing challenge, mainly because every cohort of students potentially comes with a very different knowledge base. Instructors are often required to develop and/or revise a course syllabus, and instructional materials and methods with a limited knowledge of who is going to enroll in their courses. This study administered a self-assessment questionnaire among the second year undergraduate international development students enrolled in the course Problem Solving for Development. Two rounds of assessments were conducted using the same questionnaire, one at the beginning and another at end of the course. The first assessment determined students' educational needs, and helped redesign instructional materials and methods while the second assessment determined the achievement of learning objectives at various levels of Bloom's taxonomy. Data analysis involved comparisons of self-assessment results before and after the course, and expected and actual performance of students, segregated along Kolb's four learning styles. The findings revealed that knowledge surveys serve as an effective way to enhance teaching and learning performance. Finally, using the concept of 'unlearning pedagogy' the paper discusses how knowledge surveys help students learn better, instructors plan and deliver effective lessons, and departments design and redesign effective curricula.

McWilliam, E. L. (2005). Unlearning Pedagogy. *Journal of Learning Design, 1*(1), 1-11.
Nuhfer, E. (2009). Knowledge surveys: Being clear, organized, and able to prove it. *ITL Newsletter,* 2(2), 1.
Nuhfer, E. (1993). Bottom-line disclosure and assessment. *Teaching Professor, 7*(7), 8.
Wirth, K. R., & Perkins, D. (2005). Knowledge surveys: The ultimate course design and assessment tool for faculty and students. Presented at the Innovations in the Scholarship of Teaching and Learning at the Liberal Arts at St. Olaf College.

Session 500 Plenary 3:30-4:20 (50 minutes)

SOTL as a Strategic Support for Developing Innovation in the Student Learning Experience

Tom Carey, Higher Education Quality Council & The University of Waterloo

Our SOTL work has traditionally contributed to - and consequently been supported by - institutional agendas around the quality of teaching and learning and research agendas to "advance the general state of knowledge in the discipline". A third focal point for contribution (and potential funding) has begun to emerge: SOTL work to support strategic government priorities around developing an innovation economy. This presentation asks the question: Can we use SOTL work as an exemplar to students of how research-informed innovation adds value to our work practices, to support their understanding of innovation processes, challenges and risks?

Session 600 Interactive Posters 4:30-6:00

601

iClicker Use in Multi-Division First Year Engineering Chemistry Course

Mary Robinson, Chemical Engineering, University of Waterloo

In this study, the iClicker electronic teaching aid was used in the delivery of a first-year engineering chemistry course to two divisions of an eleven division, 1200-student population. A minimum of one iClicker question was included in each 50-minute lecture; the questions posed covered basic concepts, logic, and complex problem-solving calculations related to the course material, covering the knowledge, comprehension, and application aspects of Bloom's Taxonomy (Bruck & Towns, 2009). Student performance in these two divisions was measured throughout the term with the iClicker questions and compared to the performance of all divisions through a pre-test, midterm, and final exam; student perceptions were documented through informal surveys during the term. Observations from this study will be presented, such as student perceptions and actual changes in student performance, attendance, and the impact on teaching evaluation between the iClicker divisions and compared to non-iClicker divisions (Fang, 2009). Participants will have the opportunity to use iClickers on sample questions and provide input for future research on incorporation of this technology.

Fang, N. (2009). Electronic classroom response system for an engineering dynamics course: Student satisfaction and learning outcomes. *Journal of Engineering Education, 25*(5), 1059-1067.

Bruck, A. D., Towns, M. H. (2009). Analysis of classroom response system questions via four lenses in a general chemistry course. *Chemistry Education Research and Practice, 10*(4), 291-295.

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Constructing an Effective Concept Map: an Interactive Approach to Learning and Teaching

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Concepts are schematically represented using boxes or circles, which are connected by lines representing relationships. Concept maps are powerful metacognitive study tools reportedly used for students to clarify concepts and develop learning with the end goal of providing a means of formative and self-assessment (Novak & Cañas, 2006). An interactive approach to building concept maps will be presented, including choosing a focus question and identifying key concepts connected by links and cross-links, and how the structure of maps can be analyzed and evaluated qualitatively and quantitatively (Fischler et al., 2001). As an example of assessment the evaluation of separate propositions, which can be defined as two concepts connected by a labelled arrow, was found to produce the highest scoring reliability of concept maps (McClure et al., 1999). However, correlations between concept maps and numerical grades have yet to be established. Listeners will be encouraged to participate in a concept mapping exercise involving a general topic, with the objective of understanding the use of concept mapping as a potential teaching and learning tool as well as possibilities for research.

Fischler, H., Peuckert, J., Dahncke, H., Behrendt, H., Reiska, P., Pushkin, D. B., Bandiera, M., Vicentini, M., Fisher, H. E., Hucke, L., Gerull, K., & Frost, J. (2001). *Concept mapping as a tool for research in science education*. In H. Behrendt et al (Eds.), *Research in science education – past, present, and future* (pp. 217-224). Netherlands: Kleuwer Academic Publishers.

McClure, J. R., Sonak, B., & Suen, H. K. (1999). Concept map assessment of classroom learning: reliability, validity, and logistical practicality. *Journal of Research in Science Teaching*, *36*, 475-492.

Novak, J. D., & Cañas, A. J. (2006). *The theory underlying concept maps and how to construct them*. Technical Report IHMC CmapTools 2006-01 Rev 01-2008, Florida Institute for Human and Machine Cognition, 2008. Retrieved March 1, 2010 from http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf

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Influence of Voice Pitch on Student Comprehension and Implications for Teaching Evaluations

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Teaching effectiveness is primarily based on data from student evaluations at a single time point. However, such evaluations may be influenced by factors that are typically considered to be peripheral to pedagogical effectiveness, such as quality of delivery (Madson, 2003). One factor which may affect the quality of delivery is voice pitch, which can be systematically manipulated when using computer-based instruction. In our study, the voice pitch of a male lecturer was manipulated and presented to students in separate lecture versions. Subsequently, student comprehension was assessed through a conceptual-style quiz, and lecturer attributions via a forced-choice rater task. Consistent with past studies on vocal characteristics (Feinberg, 2008a; Apple et al., 1979), we found that students perceived a lower pitch voice as significantly more attractive, confident, convincing, and reliable; interestingly, this did not provide any advantage in student comprehension or confidence. These results, applied in the context of student teacher evaluations, highlight how such evaluations may be influenced by subtle characteristics that are independent of objective teaching quality, and may suggest avenues for further research.

Apple, W., Krauss, R. M., Streeter, L. A. (1979). Effects of pitch and speech rate on personal attributions. *Journal of Personality and Social Psychology, 37*(5), 715-727.

Feinberg, D. R. (2008). Are human faces and voices ornaments signaling common underlying cues to mate value? *Evolutionary Anthropology, 17*(2), 112-118.

Madsen, K. (2003). The effect of accuracy of instruction, teacher delivery, and student attentiveness on musicians' evaluation of teacher effectiveness. *Journal of Research in Music Education, 51*(1), 38-50.

604

An Outcomes-Based Model for Curricular Assessment and Design in Pharmacy at the University of Waterloo

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Mary Power, Centre for Teaching Excellence, University of Waterloo
Roderick Slavcev, School of Pharmacy, University of Waterloo

The role of pharmacists in healthcare is expanding, punctuating the need to enhance and improve Pharmacy education (Austin and Ensom, 2008). Accurate assessment of the current gaps in Pharmacy education in Canada provides a unique opportunity for the new School of Pharmacy at the University of Waterloo to establish a non-traditional outcomes-based model to curricular design (Ho et al., 2009). Initially, we are applying this curriculum assessment and design process to the establishment of a Medical Microbiology program. A pilot study was carried out distributing a comprehensive survey to a local group of pharmacists practicing in a variety of settings including: hospital, clinic, community, independent, industry and government, to assess perceived gaps in Pharmacy microbiology and infectious disease education. Preliminary findings of the practitioner surveys will be presented and the results discussed with respect to the curricular redesign mode. We will discuss ways in which this model can act as a rubric to be applied to other curricula across disciplines. Next steps in the process of researching this curricular design will also be proposed.

Austin, Z., & Ensom, M. (2008). Education of pharmacists in Canada. *American Journal of Pharmacy Education, 72*(6), Article 128.

Ho, S., Kember, D., Lau, C., Au Yeung, M., Leung, D., and Chow, M. 2009. An Outcomes-based Approach to Curriculum Development in pharmacy. *American Journal of Pharmacy Education, 73*(1), Article 14.

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The Learning Studio Model for Experiential Learning

Lynn Long, Centre for Teaching Excellence, University of Waterloo
Marlene Griffith Wrubel, Centre for Teaching Excellence, University of Waterloo

The purpose of this research was to design a more effective workshop for promoting the adaptation of learning technology for faculty by applying Rogers' Diffusion of Innovation model (Rogers, 1983). Traditionally, workshops were led by a content expert who described the advantages of using an LMS learning tool and demonstrated its ease of use, addressing only two factors in Rogers' model. The Learning Studio was designed to address all five factors of Rogers' model by providing faculty with opportunities to work with LMS learning tools, observe others working with the learning tools and engage in small group discussion around the pedagogy of the learning tools. This poster will highlight the Learning Studio session as a more effective way to develop faculty LMS skills.

This research will also assess to what extent the participants adopt the learning technology after completing the Learning Studio. Through a qualitative survey, we will gather feedback to determine whether the Learning Studio facilitates experiential learning (Mezirow, 1995) and to explore how the formation of a "community of knowers" (Loughlin, 1993) contributes to the participant's learning.

Loughlin, K. A. (1993). *Women's perceptions of transformative learning experiences within consciousness-raising*. San Francisco, CA: Mellen Research University Press.
Mezirow, Jack. Transformation theory of adult learning. In M. R. Welton (Ed.), *In defense of the lifeworld* (pp. 39-70). New York: SUNY Press.
Rogers, E. M. (1983). *Diffusion of innovations*. New York: The Free Press A Division of Macmillan Publishing.

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Developing Undergraduate Research Skills through Co-op Placements

Nicola Simmons, Centre for Teaching Excellence, University of Waterloo
Jolyn Lee, School of Business, University of Waterloo

In the 21st century knowledge economy, the best academic experience must prepare students not only with specific workplace skills, but also with high level critical thinking, inquiry, and problem-solving skills. These research skills may be developed during co-op placements, when co-op students "function as 'applied researchers'" (Heinemann, 2005, p. 7). However, the link between co-op and undergraduate research skill development is still undeveloped in the literature. Although Rowe and Ricks (n.d.) surveyed Canadian graduate co-op programs they did not outline research skill development. Further, while the work term report is a potential mechanism for examining student learning during co-op placement, it is not clear whether in its current form it supports the development, integration, and reporting of undergraduate research skills. This poster explores the opportunities inherent in co-op placements for the development of research skills and how that development might be assessed. Through the voices of co-op student focus groups and work term reports, recommendations will be made for an improved work term reporting model that will support research skills development. Participants will be invited to contribute to these recommendations and ideas for further research.

Heinemann, H. (2005). *Is work-integrated education really "education"?* Paper presented at the WACE annual conference, June 13-17.
Rowe, P. M., & Ricks, F. (n.d.). *Cooperative graduate programs*. Accepted for publication in R. K. Coll & C. Eames (Eds.), International handbook for cooperative education. Downloaded on March 23, 2008 from http://www.watcace.uwaterloo.ca/publications/Co-op_Graduate_ Programs_-_2.pdf

607

'Bring Your Own Theatre': Negotiating Student Engagement in the Transition from Affect to Analysis in First-year Theatre Studies

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

A challenge perceived by Theatre Studies instructors is that first-year students enroll hoping to recreate earlier, transformative theatre experiences; students seem interested in the affect of theatre, but not in analyzing it. This poster illustrates an experimental learning activity in my Introduction to Theatre Studies course called 'Bring Your Own Theatre' (BYOT), through which I attempted to improve students' intellectual engagement by modeling a methodology for moving from feeling to thinking about theatre experiences of students' own choice. Although my goals for student learning (as measured by students' submissions) were exceeded, student engagement in the course as a whole (as represented in course evaluations) was lower than ever before. Participants will interact with both the design and the results of the BYOT activity and will be invited to hypothesize reasons for the decrease in student engagement in the course, with particular focus on student-centered material (McMillan and Forsyth 1991; Lucas 1990); active, instructor-modeled learning activities (Silberman 1996); 'constructively-aligned', outcomes-based (as opposed to content-based) pedagogy (Biggs 1999); and first-year students' intellectual development (Baxter Magolda 1992).

Baxter Magolda, M. (1992). *Knowing and reasoning in college: Gender-related patterns in students'iIntellectual development*. San Francisco: Jossey-Bass.
Biggs, J. (1999). *Teaching for quality learning at university*. Buckhingham: SRHE and Open University Press.
Lucas, A. F. (1990). Using psychological models to understand student motivation. *The Changing Face of College Teaching, New Directions for Teaching and Learning, 42*. San Francisco: Jossey-Bass.
McMillan, J. H., & Forsyth, D. R. (1991). What theories of motivation say about why learners learn. *College Teaching: From Theory to Practice, New Directions for Teaching and Learning, 45*. San Francisco: Jossey-Bass.
Silberman, M. (1996). *Active learning: 101 strategies to teach any subject.* Boston: Allyn & Bacon.

608

Connecting to Chemistry: Teaching Methods to Provide Real-life Relevance

Jason Dockendorff, Department of Chemistry, University of Waterloo

Associating course material with recognizable or familiar concepts provides students with relevance and can aid in their engagement and motivation in the learning process (Kember, 2008). Creating relevance by connecting curriculum to real-life can be accomplished by various teaching methods including the use of case studies or recent media (Barak, 2007), tangible teaching through demonstrations and field study, or implementation of analogies (Orgill, 2007). Diversifying the learning environment by using these methods could increase retention rates, improve grades, motivate students to pursue the field further, and reduce the common misconceptions that students have about chemistry education. This literature review aims to provide a base understanding of some methods that have been used to accomplish real-life relevance in the undergraduate chemistry classroom and the effects these methods and teaching styles have on students.

Barak, M., Carson, K. M., & Zoller, U. (2007). The 'Chemistry Is in the news' project: Can a workshop induce a pedagogical change? *Journal of Chemical Education*, *84*(10), 1712 – 1716.
Kember, D., Ho, A., & Hong, C. (2008). The importance of establishing relevance in motivating student learning. *Active Learning in Higher Education*, *9*(3), 249 – 263.
Orgill, M., & Thomas, M. (2007). Analogies and the 5E model. *The Science Teacher, 74*(1), 40 – 45.

609

Preparing Students for the Objective Structured Clinical Exams (OSCEs) for Licensure as a Pharmacist

Lisa Craig, School of Pharmacy, University of Waterloo

This poster outlines preliminary stages in our work preparing students early in our curriculum for the Objective Structured Clinical Examinations (OSCEs) that are a requirement for licensure in Canada. Students move from the level of knowledge acquisition and comprehension along with application in the first term of their first year using nonprescription products. The students then advance from analysis to synthesis in the laboratory setting from first to second year using standardized patients/actors. The progress to evaluation of others occurs in the third year of the program. This process would follow Bloom's Taxonomy of Learning which categorizes instructional activities into a hierarchy of levels moving towards a higher level of thinking. Our intention is to evaluate whether this is in fact true - does practicing OSCEs in this manner (in stages with gradual increase in challenge) help to reinforce learning that is acquired each year? If so, what is the impact on student learning, and ultimately, on professional practice?

Bloom, B. S., Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York: Longman.
Bloom, B. S. (1956). *Taxonomy of educational objectives. Handbook I: The cognitive domain.* New York: David McKay.

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What Do Students Really Think? Comparing Instructor and Student Perspectives of Critical Self-Reflection in Teaching and Learning

Toni Serafini, Sexuality, Marriage & Family Studies, St. Jerome's University
Carm De Santis, Sexuality, Marriage & Family Studies, St. Jerome's University

The important of critical self-reflection is for transformative learning is clearly established in the literature (e.g., Cranton, 2006; Mezirow, 1991, 2000). How critical self-reflection is defined in the undergraduate teaching environment may differ across among individuals, and perhaps more significantly, across instructors and students. This poster presents preliminary results of an exploratory study of teacher and learner definitions of critical self-reflection and its importance in the teaching/learning domain in a small undergraduate university. Participants' definitions of critical self-reflection are compared across disciplines and across informant groups (i.e., teacher vs. student). Implications for teaching pedagogy and transparency in the teaching process are highlighted. Attendees are invited to participate in this process of interpreting results and their implications for teachers, learners, and researchers alike.

Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults (2nd ed.)*. San Francisco: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress.* San Francisco: Jossey Bass.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.

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Wrestling with Concepts: Reflective Activities for Learning about Sexual Ethics

Tracy Penny Light, Sexuality, Marriage & Family Studies, St. Jerome's University

Reflection is the cornerstone of deep learning and also an opportunity for students to integrate their knowledge from different contexts (Chen and Penny Light 2010, Huber and Hutchings, 2005). This is particularly important in a context where students need to wrestle with challenging concepts to develop and articulate their own ethical perspective and what has shaped it. This poster outlines how concept maps can be used for reflection, providing students with an opportunity to develop their visual learning abilities, while also encouraging "reflection in action" (Yancey, 1998). Students' changing concept maps provide evidence of how students internalize, transfer or have transformative learning experiences.

Chen, H. L., & Penny Light, T. (forthcoming, 2010). *Electronic portfolios and student success: Effectiveness, efficiency and learning.* Washington, DC: Association of American Colleges and Universities.

Huber, M. T., & Hutchings, P. (2005). *Integrative learning: Mapping the terrain.* Washington, D.C.: Association of American Colleges and Universities.

Yancey, K. (1998). *Reflection in the writing classroom*. Logan, UT: Utah State University Press.

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Student Learning Styles and Sense of Entitlement

Jean Andrey, Geography & Environmental Management, University of Waterloo
Vivian Schoner, Centre for Teaching Excellence, University of Waterloo
Rohan Jayasundera, Department of Physics and Astronomy, University of Waterloo
Erin Joakim, Geography and Environmental Management, University of Waterloo

This study on undergraduate student engagement is motivated by the reported perception that there has been a decline in engagement in learning accompanied by an increased sense of entitlement to easy credentials (Côté, 2007). This project explores student engagement in learning based on the results of a survey administered to a sample of students enrolled full-time at the University of Waterloo. Survey themes were similar to those used in the Enhancing Teaching-Learning Environments (ETL) project, conducted jointly by researchers from the Universities of Edinburgh, Coventry, and Durham (Entwistle, 2008). We adapted a number of their survey items for Deep, Strategic, and Surface learning orientations, and we added items related to surface learning and sense of entitlement. Eight of the 90 learning-based questions were poorly associated with others in the same scale and subscale, indicating conceptual incongruence-and so these were removed for the findings reported here. Analysis of the remaining items demonstrates that there is a significant inverse relationship between Deep and Surface Learning and a strong positive correlation between Deep and Strategic learning. The ways in which sense of entitlement connects with learning strategies was found to be complex.

Côté, J.E. (2007). *Ivory tower blues: a university system in crisis*. Toronto: University of Toronto Press.
Entwistle, N. J. (2008). *Taking stock: teaching and learning research in higher education*. Review prepared for an international symposium on "Teaching and Learning Research in Higher Education", Guelph, ON, April 25-26.

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Saving the Planet, One Assignment at a Time

Rudy Peariso, Centre for Extended Learning, University of Waterloo
Anuja Bajaj, Centre for Extended Learning, University of Waterloo

In this interactive poster session read, hear, see and experience how the Centre for Extended Learning (CEL) is meeting the challenge of providing timely feedback to students in an environmental and financially responsible manner. Through the use of Microsoft Word's Track Changes, Macro shortcuts, digital inking using Tablets, and online quizzes with automatic feedback, instructors and markers are able to provide valuable and timely guidance to students as they progress through their coursework. Using an action research paradigm, qualitative and quantitative data are collected from participants (both students and markers),whose experiences continue to inform the decisions as we move forward. Action research can be described as "a transformative orientation to knowledge creation" (Bradbury Huang, 2010, p. 93). Initial findings from this study will be presented.

Bradbury-Huang, H. (2010). What is good action research? *Action Research 8*, 93-109.