Initiating Innovation in Post-secondary Institutions—Customizing Teaching and Learning Environments for the Twenty-First Century: Collective Reflections from the 2014 Cohort of 3M National Student Fellows

Heather Carroll
Memorial University

Shwetha Chandrashekhar
University of Guelph

Danny Huang
University of Alberta

David Kim
University of British Columbia

Peter Liu
University of Calgary

In light of the enormous changes presently unfolding in the higher education landscape, we do not have to look too far to recognize evidence of the transformation and redefinition of the construct of both teaching and learning in the information age. With a growing focus on teaching and learning at all levels of post-secondary institutions, innovation is reflective in the introduction of new learning spaces, state-of-the-art technology-enhanced education, and prominence given to discussions about adapting teaching and learning to the twenty-first century. Likewise, in this article we examine the reflections, ideas, conversations and exchanges inspired by the cohort's plenary planning discussions and the current innovations reshaping Canadian higher education.

Overview

The five of us represent the 2014 cohort of 3M National Student Fellows, the third cohort to be recognized since the 2012 establishment of this national award recognizing leadership in undergraduate students. It has been an honour, a privilege and an incredibly enriching opportunity to begin our roles as National Student Fellows as a part of STLHE's 34th annual conference Transforming Our Learning Experiences, in June 2014 in Kingston, Ontario. This article is a collective collaboration of the diverse perspectives and experiences we discussed during our plenary.

Introduction

Canadian post-secondary education has witnessed and continues to survive through sweeping shifts in circumstances in the past few decades. The demand for advanced education to complement the complexities of the current economy has soared as the skill requirements for employment have escalated (Crocker & Usher, 2006). This shift in innovating in higher education is supported by emerging initiatives such as the 3M Student Fellowship, which provides young voices with the opportunity to expand their participation in reshaping higher education. The following explores the 2014 3M National Student Fellows' perspective on innovating and customizing the post-secondary experience.

Students as "Thinkers" and "Doers": Are We Encouraged to Innovate "Outside the Box?"

Heather Carroll

Innovation is a uniting concept amongst the 2014 cohort of 3M National Student Fellows, and our work is primarily focused on the context of post-secondary environments. Creating productive change in institutionalized practices is at the forefront of this discussion. Through my experience in post-secondary education, I challenge administrators to consider whether initiating innovation in a post-secondary institution must come from the top down. It would be innovation in its truest form if students could innovate outside of their institution's prescribed boundaries.

Memorial University, and its department of Career Development and Experiential Learning, allows students to create their own jobs as part of the Memorial Undergraduate Career Experience Program (MUCEP). These are called Bootstrap MUCEPs, and they are available to students across all disciplines and years of study. The possibilities of created jobs are as virtually limitless as the students' imaginations. This program provides students with the opportunity and encouragement to innovate as both "thinkers" and "doers." As someone who created a job within this program, I relished the opportunity to both think of and act on an idea and watch it transform into something concrete.

As a student in Memorial University's Bachelor of Primary/Elementary Education program, I have noticed many areas of improvement within my program, mainly in relation to the internship structure and delivery, which are going seemingly unnoticed and unaddressed. In December 2012, I began to challenge the administration of my faculty to be accountable for the program structure, and be able to offer explanations for the areas that are doing a disservice to the students, namely, the students in the Integrated Stream of the Bachelor of Primary/Elementary Education. My classmates and I take four years (eight semesters) of coursework related to our field, before finally being allowed to do an internship, in the last year of our five-year program, for an entire 13-week semester.

I believe the present and future students enrolled would benefit from a re-structuring of the program that allows us to engage in experiential learning opportunities earlier than the current model does. The structure disregards key research done on experiential learning and its maximization of retention, of impact, and of the contextualization of material. Chapman, McPhee, and Proudman (1995) suggest that a balanced mixture of content and process is "required no matter what activity the student is engaged in or where the learning takes place." By only allowing one mega-internship, students are also denied the ability to diversify their experience; they are being exposed to only one co-operating teacher, at one school. This troubled me, so I independently sought a 13-week teaching internship in Cambodia, over a year before my program-sanctioned internship, and tried to prove its validity

by integrating it with my degree in some way. I tried to count it as first an (extra) internship, then as an elective course, then as an independent study, and finally as research based special topics course. I was unable to do any of those things, at the sole discretion of the Faculty of Education's administrators.

Regardless of the Faculty's reasons for not updating their program structure to align with current research, they are sending a message to students that they are unable to independently seek field work, and that no teaching is really considered teaching unless it has their approval. I tried to innovate, but not in a way that was expressly acceptable, and was denied permission to consider it academic. The program structure is not allowing students to maximize their university experience and is falling short in both experiential learning initiatives and in space for innovation. I learned a lot through my work in Cambodia, and I believe that the faculty could be doing more to allow students to merge independently sought work with the program in an innovative manner, and to ensure that their graduates are developed to the best of their ability and potential, especially when the program structure is in its current state. This development can be done by facilitating and providing diverse opportunities throughout the program.

Innovative endeavours are full of success stories, and I hope to see more university created innovation opportunities, such as the Bootstrap MUCEP. However, students should be encouraged and supported when they try to innovate "outside the box." For the future of 21st century post-secondary education to embrace innovation more fully, students need a platform, resources, and support to innovate in a more daring manner. Beyond the post-secondary environment, innovation rarely comes with a program plan, and it often involves challenging entrenched norms. Innovating in a sphere that is regulated from the top-down is limited, but innovating from the roots up, from students into institutionalized practice and beyond, there is nowhere to go but up.

Meta-Learning: The Need to Teach "Why to Learn" and "How to Learn"
Shwetha Chandrashekhar

Over the span of the six years I have spent as an undergraduate student, the moment I began to succeed and excel in my program was the very moment I sought to actively understand why to learn and how to learn. My journey allowed me to recognize that the fashion in which higher education is structured has the power to craft societal tapestry and initiate needed change. I further realized that the very substructure of higher education holds blueprints for innovation and new systems of thought that await execution. Yet, it dawned on me that none of this is common student knowledge, and neither is it a teaching priority. This consequently creates an infrastructural issue, because actualizing the potential of formalized education ultimately rests on the conscious initiation of innovation within higher education environments.

In the last decade, Canada has generated a wave of innovation across several university and college campuses through its adaptations of modern-day teaching and learning (Crocker & Usher, 2006). However, to remain at the forefront of the best and most sustainable education practices globally, the very basic and elemental tenets of post-secondary education, understanding the "why" and the "how," must be addressed. One of the primary issues with post-secondary education in today's world is twofold: 1) a lack of understanding why to learn, as there is an obscured perspective of the tangible value of a post-secondary education, and 2) a stagnation in how to effectively learn, as there is a desensitization to the process of learning itself. This is mostly attributed to a lack of innovation in teaching styles within post-secondary environments, which possibly results from the human habit of doing things the way they have always been done before. Both of these issues are by-products of weak communication between institutions and their students, and a result of a

challenge universities face presently: defining exactly what their purpose is in the post-modern world.

Students and learners alike must first be proactively and consistently educated about the importance of self-management during their undergraduate studies. This begins by introducing them to the importance of education and to the need for their personal commitment to learning, which is key to keeping them engaged, motivated and actively connected to their academic pursuits. Twenty-first century learners must understand that the modern day post-secondary curriculum can be customizable to their requirements. It is vital that they know that it is in their hands to complement their in-class learning with co-curricular activities and real-world experience. What this does is encourage and foster a learning culture in higher education that initiates and leads innovation in teaching and learning from a multitude of directions. Opportunities such as completing a semester abroad, actively seeking relevant internships, getting involved on campus with initiatives that further academic efforts, and taking the time outside of the classroom must be seen as critical complements to formal education.

However, this requires as mentioned above, a greater effort in communication and interaction between faculty and students. What is required now is institutional transparency. This would ensure that a clear picture is presented to students, conveying that attending classes and completing degree requirements satisfies only part of what is needed to extract the most out of the financial investment made in their post-secondary education. That being said, students must be taught about the power and relevance of education for survival in society. Doing so would begin the reconditioning of old systems of thought, which position formal education as a means to an end rather than a catalyst to personal and professional development. This is evident in current student perceptions, which falsely accept that merely completing the basics of a degree will land them a related job in their field of study, and further allow them to create a career with purpose. One potential solution is weekly seminars mandated with required attendance and required for degrees, throughout all years of studies, which aggressively prompt and encourage the dialogue about how to make the most out of what is being taught within the classroom. Doing so will demarcate an effort in nurturing the growth of our future professionals. Although this type of effort may meet with student apathy initially, it will at the very same time, birth a culture which promotes a love for self-reflection and learning, two necessities for extracting concrete value from formalized education.

This type of initiative goes hand in hand with something I am passionate about incorporating into classrooms: talks by real-world professionals. I remember attending a class during my first semester of undergraduate studies, which was not graded but required attendance as a degree requirement, in which top executives from the business world, entrepreneurs and the like, would come into class and speak to students about their undergraduate journey and how they ultimately defined a meaningful path for themselves. Doing so heightened the connection between what my peers and I were learning on a small scale and the larger picture at hand. It allowed us to understand the various opportunities that lay ahead us post-graduation. It kept education current and in touch with the reality we are distanced from as students immersed in theoretical and abstract material.

These forms of institutional initiatives are key in expanding students' horizons and elevating their personal ambitions by providing them with industry exposure. Successfully offering and incorporating these learning opportunities would require universities to refresh their professional networks and initiate an interdependent community effort in redefining and revitalizing exactly how formalized post-secondary education can add value to society at large. In all, a thorough reconditioning of student and faculty mentality is required in establishing a novel approach to post-secondary education. "How to learn" and "why to learn" are key elements in creating and sustaining a value-based approach to interactive educational systems which initiate student engagement and set new trails for a new world ahead.

Transition from Memorizing to Solving: Tackling Hard Issues in Society

Danny Huang

When I think about what provides the most satisfaction during my undergraduate career, I conclude that it is being able to solve practical problems. During my time at the University of Alberta, I have had numerous opportunities to tackle difficult problems both in academia and in my community. These opportunities provided the framework for me to build a critical set of skills—leadership, collaboration, public speaking—that I would not otherwise have gained by attending my regular science classes.

The solutions to some of the most challenging issues in the twenty-first century cannot be found in textbooks nor can they be generated by simply regurgitating information. From global poverty to institutional discrimination to disease outbreaks, these examples require us to be flexible, resourceful, innovative, and most importantly, to be collaborative. I believe that the post-secondary environment can be an ideal incubator for these traits, however only when there is sufficient emphasis on problem solving. Most current classrooms retain the traditional lecture approach that mainly focuses on memorization and test-taking abilities. A shift to a model where students are more actively engaged in solving problems would be instrumental for preparing us to meet global challenges.

One way of incorporating a problem-based approach to learning is through student-led research projects. Specialized programs at many post-secondary institutions already offer courses that supplement content with researched-based inquiry and allow students to tackle questions through unique means. I have had the opportunity to conduct biomedical research since Grade 11, and I have enjoyed every moment of it. From performing experiments in pediatric oncology to performing statistical analysis in epidemiology, I have learned, re-learned, and refined important skills, which include troubleshooting, critical-thinking and perseverance. In a similar manner, the active promotion of student-driven projects in the community serves to foster the problem solving process. When I had learned certain science programs are not readily accessible to rural students, I co-founded a non-profit organization to install university-level science programs that emphasize participation from under-resourced communities. The results have been promising: we have engaged more than a hundred students and have secured over $28,000 in funding. The idea behind a problem-based approach is that students can take ownership of their learning.

Additionally, the underlying mechanism of assessing students should be re-evaluated to reflect the problem-based strategy to learning. Most traditional exams rewards us based on the amount of information we can memorize in relation to a particular topic, but by no means do they indicate if we can meaningfully use that information. As a result, the memorized material becomes meaningless shortly thereafter. Instead, I believe a better method of assessment would be to focus on how well students, using key skills, solve practical problems. By focussing course content around identifiable problems, students can gain the requisite skills for tackling difficult questions in their own community. For instance, implementation of problem-based learning in medical education is associated with a more enjoyable student experience and enhanced interpersonal skills and psychosocial knowledge (Chan et al., 2000). Further, problem-based learning is flexible. It can be supplemented with additional instructional material such as podcasts and worksheets to ensure the same breadth of knowledge is provided as in conventional lectures (Johnson, Herd, Andrewartha, Jones, & Malcolm, 2002).

The tendency of equating learning to simply obtaining new information is problematic and should be clarified in order to enhance student education at the post-secondary level. I believe that post-secondary learning should be primarily focused on active problem solving. The amount of the detailed, dense materials memorized should not be the sole metric in defining a student's progress in the classroom. Only by filtering class material through a lens of societal applicability can we achieve an education that aligns

with the needs of communities and industries. I believe that we, as students, have to take ownership of our learning, because when we do, we learn not out of necessity of learning, but out of our genuine interest and passion.

A Focus on Improvement and Exploration in the Twenty-First Century Post-Secondary Educational Setting

David Kim

Through my post-secondary educational experience, I have learned much about the way we educate today's students. By reflecting on my experiences and what I have learned, I question if traditional teaching methods are the most effective in preparing today's students to face real world challenges. In the twenty-first century, we have seen exponential growth in the depth of knowledge that humans possess. Yet, we are facing some of the toughest challenges that society has ever had to face. From the growing dangers of climate change to youth unemployment to political instability across the globe, we as a generation face countless issues that we will one day inherit. Our education should prepare us to face those challenges. The struggles and the triumphs of the twenty-first century provide a challenging yet exciting opportunity to really employ educational methods that can make a difference on a larger scale. Thus, it is paramount that we apply dynamic pedagogical approaches that not only challenge traditional methods but also ensure that we are teaching our current generation of students in a way that is relevant, effective and pragmatic.

The first step is ensuring that the basic foundation of education is based on improvement and life-skill learning instead of achievement, which seems to be the current focus. Achievement-oriented teaching can be a barrier to fostering creativity and self-exploration, both of which I believe are important in being able to apply learned knowledge beyond the walls of the classroom. From personal experience, I

know that individual students within an academic culture of achievement sometimes have difficulty acknowledging imperfection and instead focus on attaining the typical image of perfection that they are supposed to achieve that is set out by academic institutions. The current social norm in various areas of higher academia is that students need to succeed and always strive for that "A+" without acknowledging the importance of deep learning. This focus on grades perpetuates the culture of achievement. In addition to a grades-based approach, an improvement-based model can supplement the current grading modalities with a focus on individualized metrics of ability with specific identifiers for areas of improvement. Both educators and learners can follow a learner's progress through time with this individualized metric and decrease the over reliance on grades, thus focusing on self-improvement across a time span. This ensures that the focus is on the growth and progress of that student's knowledge and competence over time.

As a medical student, this focus is of particular importance to me. Medicine is known for its culture of achievement and results, which can be harmful in the educational and real-world setting. As future physicians, it is important that we learn the importance of learning from our mistakes. A culture of improvement, particularly in the context of medical education is very important. What we learn in the classroom will be applied to our future patients. In order to improve care and optimize patient outcomes, a culture of improvement that starts in the classroom will translate into better clinical practice and better interdisciplinary cohesion. Secondly, exploration and experiential based learning needs to have a bigger role in post-secondary education. Ultimately, we have to educate the students of today to apply what they learn in the classroom to real world scenarios. I think a large piece comes from active teaching strategies. We have to connect things that are taught inside the classroom to real world problems. Context needs to be given to establish relevance of the material being taught.

From personal experience, I have to admit that a significant portion of my learning during my post-secondary years has come from extra-curricular

activities. If these can be integrated into current teaching strategies as parts of the curriculum, I think we can begin to make small strides towards exploratory and experiential based teaching strategies. This can involve creating course requirements to actively participate in community programs that are relevant to the material being taught or encouraging students to volunteer with organizations to teach life-skills relevant to the topic being taught. These methods will really encourage prospective and retrospective learning by having students engaged in learning outside of the classroom.

These two things are important in how we teach twenty-first century learners. I believe that when there is more focus on improvement, achievement will naturally follow. If there is a shift towards an improvement model, we can focus on ensuring that students acknowledge gaps in their learning, which will allow further pursuit of knowledge. An environment that values improvement over achievement will also create a safer and healthier classroom for both students and educators. A culture based on improvement is a culture that can cultivate growth and development both inside and outside the classroom setting. Additionally, experiential and exploration based teaching methods can help translate what we learn in classrooms to action outside of the classroom. Encouraging a student to utilize what they learn to solve real issues while contributing to the community is an ideal model to teach problem solving. These two strategies can be a small step in ensuring that we are employing the right strategies to teach the students of today to be the leaders of tomorrow.

The Twenty-First Century Network

Peter Liu

We are most receptive to changes, new adventures, and diverse perspectives in our early twenties. Post-secondary education is an ideal complement for exploration as young adults thrive in a diverse community. At no other time are we going to be simultaneously exposed to peers from the arts, science, and business on such a massive scale, providing an ideal opportunity to weave a collaborative network using a trans-disciplinary approach. This is especially important in the twenty-first century, where collective knowledge is rapidly expanding and individual expertise is becoming increasingly more specific. The need for collaboration is further reinforced by our interconnected international community, which in many areas of the world is facing complex problems.

As a result, being able to effectively communicate and collaborate across disciplines is indispensable to achieving unified goals and implementing solutions to the complex issues that challenge our generation. Twenty-first century post-secondary education has a role in instilling collaboration skills in students on an institutional, national, and international scale. Here, I will present tangible strategies that can be implemented to allow students to learn from a multi-disciplinary network within and beyond our post-secondary institutions.

In recent years, there has been a drastic increase in tailored academic, extracurricular, and career development programs based on students' personal interests in institutions across Canada. We can take faculty and department level programs one step further by establishing inter-faculty community service projects to unite students with diverse backgrounds. For example, the University of Calgary offers a leadership development program called the Emerging Leaders Program (ELP) for first-year students. With a series of personal development, team building, and community service projects, ELP brings together students who share similar passions from various faculties to make positive contributions in their communities. At a personal level, ELP inspired me to combine education with leadership, put my academic knowledge to the test in real-world situations, and learn from peers from diverse fields. Through their interactions with others, students are exposed to the full spectrum of knowledge, not just what is taught within their majors, allowing them to get the most out of their education. As a result,

encouraging inter-faculty immersion learning and collaboration is pivotal to enabling students to contribute to the twenty-first century network.

The same multidisciplinary network can also be applied to link post-secondary institutions across Canada. Our current framework manages post-secondary institutes under multiple jurisdictions, allowing programs to be tailored to specific needs. However, lacking a consistent framework for post-secondary education also hinders inter-institutional interaction. This is especially true at the undergraduate level, which lacks regular conferences and communication to connect students. Thus, communication within and between institutions is the key to expanding students' learning spectrum. By establishing regular national conferences bringing together post-secondary students across Canada, we can provide a platform for students to learn from each other. Because each jurisdiction has unique advantages to their post-secondary systems, this also allows students and faculty to exchange ideas, be inspired, share novel concepts, and implement innovations.

The increase in the popularity of international opportunities in higher education further expands the importance of interaction from a national to a global scale. Because our world is becoming evermore interconnected, it is crucial that we understand our global community. Service and community learning is the best way to achieve this goal. Personally, I was able to benefit from a number of international opportunities during my undergraduate program, which focused on hands-on learning. With the Global Health Program in the Cumming School of Medicine, I had the opportunity to help organize and teach a course on molecular and microbiology for research capacity building in Nicaragua. I was the youngest person on the team, even younger than my students who were professors, physicians, and researchers.

This was an incredible learning experience as each person in the program, from students to organizers, was a leader in their field. As a result, the traditionally defined lines between educators and students were blurred. Instead, a bilateral pedagogy strategy emerged. As a student and an educator, I learned about the needs and backgrounds of each of my students and tailored my teaching to capacity building that can be applied to identify solutions for the most pressing healthcare problems in Nicaragua. Through a train-the-trainer paradigm, students in the course can in turn spread these capacities to their existing national networks to achieve sustainable development.

This international experience further broadened my horizons by allowing me to experience a field that seemed familiar to me in a foreign setting. The underlying techniques of science and medicine might be the same but their applications can be drastically different depending on geography, society, and culture. This is also true for the arts, engineering, business, and education. Thus, international opportunities as a supplement to teaching in the classroom will help students take the first step towards applying their knowledge as global citizens.

Post-secondary institutes should focus on developing comprehensive volunteer and exchange programs for their students. Because financial and resource limitations might hinder students from integrating international experiences into their post-secondary education, institutions should provide a myriad of internal and external funding dedicated for students who can further unleash their potential through experiences abroad. Furthermore, classroom learning should also emphasize the importance and application of knowledge taught both for the local and international communities to contextualize students' education. In addition, establishing connections with international post-secondary institutes allow Canadian universities to foster a strong global network. This intensive network of global citizens and post-secondary institutions will align higher education with the ambitions of the twenty-first century.

Conclusion

As can be seen, from coast to coast, the challenges and rewards associated with innovating in higher education are as diverse as the communities fostering them. The variety of institutions and disciplines involved in the movement towards a more creative, collaborative, and progressive teaching and learning environment will undoubtedly usher students into the innovative twenty-first century social and intellectual climate. To yield maximum results, networks, exploration, commitment to improvement, authenticity and problem solving must be integrated into post-secondary mandates, and therefore support innovative endeavours at large.

References

Chapman, S., McPhee, P., & Proudman, B. (1995). What is experiential education? In Warren, K. (Ed.), *The theory of experiential education* (pp. 235-248). Dubuque: Kendall/Hunt Publishing Company.

Crocker, R., & Usher, A. (2006). Innovation and differentiation in Canada's post-secondary institutions. Canadian Policy Research Networks Inc. http://higheredstrategy .com/wp-content/uploads/2011/07/CPRN_ InnovationandDifferentation.pdf

Johnson, E., Herd, S., Andrewartha, K., Jones, S., & Malcolm, S. (2002). Introducing problem-based learning into a traditional lecture course. *Biochemistry and Molecular Biology Education. 30*, 121-124. http://dx.doi.org/ 10.1002/bmb.2002.494030020023

Nandi, P.L., Chan, J.N., Chan, C.P., Chan, P., & Chan, L.P. (2000). Undergraduate medical education: comparison of problem-based learning and conventional teaching. *Hong Kong Medical Journal, 6,* 301-306.

http://www.hkmj.org/system/files/hkm0009 p301.pdf

Acknowledgements

Biographies

Heather Carroll is completing a Bachelor of Education at Memorial University who is passionate about teaching and learning in a local and global setting. Through her time as a volunteer teacher at a school in Fiji and an orphanage and school in Cambodia, she experienced firsthand that education is a pillar of sustainable poverty reduction. She is challenging her faculty to include an international component, believing that they can create a

movement that will liaise and encourage education students to work in the developing world.

Shwetha Chandrashekhar is enrolled in a Bachelor of Commerce degree with a Major in Human Resource Management at the University of Guelph. She raised almost $6,000 for sustainable education projects in Latin America with her team of volunteers by running several exam review sessions while Chapter President of Students Offering Support Guelph, one of several charitable sustainable social ventures across North America. She also conceptualized and initiated Redefining Success: How to Win at University & Life. She has co-founded Guelph Commerce Women in Business to encourage female students to embrace the reigns of leadership.

Danny Huang is an Honours Biochemistry student at the University of Alberta. He has been extensively involved in research and community leadership. Danny's investigation into prostate cancer has received the Gold Medal, Platinum, and Best-in-Fair accolades at the Canada Wide Science Fair 2011 and was one of the four regional projects to represent Canada at the International Google Science Fair 2012. Danny is continuing his work in cancer biology, epidemiology, and structure biology, while co-authoring various scientific publications.

David Kim is completing a medical degree at the University of British Columbia. He founded UBC Students Offering Support with fellow students. David was the Chief Operating Officer of the World Model United Nations Conference in 2012. David serves as one of the directors of the UBC Alma Mater Society, volunteers as a piano instructor for marginalized youth, does research at the UBC Department of Urologic Sciences, and teaches taekwondo in the community with proceeds going towards charities.

Peter Liu is a Bachelor of Health Sciences student at the University of Calgary, majoring in Biomedical Sciences, Peter's optimism for life stems from his transformation from a disease burdened child to an international gold medalist in martial arts. He iss the Ambassador for the Class of 2015. As an Executive in five student organizations, he is a dedicated advocate for social justice, healthy living, and global health. In addition, as an Orientation Leader, peer helper, and leadership workshop facilitator, he has an indispensable role in cultivating future leaders.