Student-Centered Learning: Subversive Teachers and Standardized Worlds

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P.K. RANGACHARI AND ROSALYN JOHNSON

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A Note to Readers

P.K. Rangachari/Stacey Ritz

"When you set out for Ithaka ask that your way be long/Full of adventure, full of instruction." So begins C.P. Cavafy's oft-quoted poem, Ithaka. Though the metaphor of a journey has often been used for a student's passage through an educational system, it applies equally well to their teachers. Promises and perils dot their way. Student-centered learning is often touted as a panacea for educational ills but can quickly slide into self-indulgence. So, teachers need to steer carefully through the twin Scylla of standardised tests and the Charybdis of self-indulgent learning.

This collection is a tribute to Delsworth Harnish, a master navigator through the treacherous waters of academia. He knew all the rules and broke them with impunity. He set up programmes that fostered self-directed learning and was quite averse to standardised testing, which he felt stifled true learning. He had a particular fondness for Postman and Weingartner's *Teaching as a Subversive Activity*. When we decided to gather together essays to honour his memory, we asked contributors to consider several themes. These included the possibilities of promoting student-centred learning in a standard-based world, dimensions of subversive teaching in our troubled times, and the subtler notion of justice.

We asked contributors to think about these issues and write about them in a personal way. We wanted the essays to capture Del's interests but be true to his spirit as well. He was quirky, often elliptic and impatient with the pedantic formal. We gave licence to the contributors to write about these themes in any way they chose. We wanted an unprescribed collection, even to the point of having no set pattern for the references, in case authors chose to use them.

Bacon felt that "Some books are to be tasted, others to be swallowed, and some few to be chewed and digested." What readers make of this collection is up to them. We wanted this book to be

browser-friendly. The essays in this book have no set style—many are riffs on the themes we have mentioned, others take on a more formal hue. If it all adds up to a patchwork quilt, so be it. Del Harnish would have liked it that way.

Acknowledgements

A sincere thanks to Dr. Stacey Ritz for continuing support and encouragement, Joanne Kehoe for all her help in making the collection coherent and readable, Chris Lombardo for his inspiring cover design, and the Canadian tax-payers who support publicly-funded Universities such as McMaster University.

John Kelton

For a long time, Del Harnish worked down the hall from me, but we barely knew each other. He did his work in virology. I did mine in haematology. We crossed paths, but oddly, none of our interactions stuck in my memory. Then I met the real Del, the shadowy secret agent, and he would be a vivid character in my life for the duration of our friendship.

I was walking across campus one night. It was dark and still, with a thick fog resting heavily on the ground. Coming up to MUMC I could see someone at the back of the medical centre. He was leaning at an angle against the building, one leg bent back against the wall. He was smoking a sinister-looking black cigarette. As I approached, this mysterious figure took a long drag, tilted his head back and blew the smoke up to feed the fog.

He looked like a character from a black-and-white Bergman movie—a spy, a cat burglar, an agent provocateur!

"Del," I said, "is that you?"

"Yes," he replied.

"What are you doing?"

"Thinking," he said. I was soon to learn that when Del was thinking—which was almost always—amazing things would inevitably follow. In fact, for the next 30 years, I watched Del embrace the role of covert operative and agent provocateur based largely on the power of his thinking. He may have started in virology, but he found his calling in education. He set aside the linear discipline of basic research and moved into a field and a role where his devilish imagination would not be constrained. He always carried with him valuable lessons learned in the lab—the power of a well-framed question, for example—but a figure who could look that cool smoking in the fog was destined for something different than the grind of laboratory work.

Predictably, every time I retold the story of that fateful, foggy encounter, Del would belt out his wonderful laugh. I was never sure

if he was laughing at the circumstances of the meeting, at his own image, or at the obvious delight I took in telling the tale.

Around the dawn of the new millennium, our Faculty was looking for someone to lead a novel program called the Bachelor of Health Sciences. With some hesitation, Del took the position and quickly displayed his immense capacity for disruptive and constructive innovation. As the program's founding assistant dean from 2000 to 2015, he excelled as an educator and champion of inquiry-based, student-centred pedagogy. His vision and character defined the program's trail-blazing reputation and helped make it the most sought-after undergraduate program in the country.

If ever there was the perfect job for a person who tolerated university rules while dedicating himself to anarchy, it was Del's job. He would often remark that education should be a full-contact sport. He was a man who loved the scuffling and high sticking in the corners around the pedagogical goal.

Del had a prodigious mind and a formidable memory for the most microscopic and tedious rules and regulations … provided they supported his argument of the day. And when it would be brought to his attention that there was an opposing perspective on the same guidelines, he would give his half smile and simply say, "Well, that's one interpretation." One of Del's several subversive mottos was, "Don't bend the rules. Break them." He would often begin his morning with the question, "What kind of trouble can I cause today?" He would just as often end the afternoon by declaring, "The rest of the day is cancelled, due to a lack of interest on my part."

As the BHSc program evolved into national prominence, *Maclean's* magazine declared it to be the finest undergraduate program in Canada and Del soon arrived in my office full of pride, pointing to the article. He said, "You know what's best about this? Every student arrives wanting to go to medical school and by the time I'm done with them, most realize there are better things to do with their lives."

His leadership style was ambitious and idealistic, inspiring many.

As the vice-dean of undergraduate health sciences education from 2015 to 2018, he was a visionary leader in launching collaborative cross-Faculty programs. Yet, as his influence, profile, and impact expanded, he maintained a delightful inability to suffer fools gladly, and I learned emphatically that I was a frequent inductee into his gallery of dunces. However, the curmudgeon in Del was always quickly overrun by the obvious joy he derived from the colleagues and students who were drawn to him like steel filings to a magnet. It was even more obvious that he adored his wife Liz and children Shaundra and Lauren. Outside of work, you never saw Del without Liz, unless he was at Home Depot.

Del Harnish was one of our country's most decorated educators. He earned several McMaster and national awards for curriculum development and was a 3M Teaching Fellow, Canada's highest award for university pedagogy. Yet, these resumé virtues describe Del the same way the word "orange" describes a sunset. Del wasn't a biography, he was an experience. He was qualitative … and the essence of that quality was that he is irreplaceable.

There are things in life we can read and hear about, but we cannot truly understand until we experience them ourselves. Not coincidentally, these are the most encompassing, confounding, and transforming experiences–things like falling in love, becoming a parent, discovering something revolutionary. With these experiences, we never truly understand until they happen … and Del was a happening.

For someone who loudly professed his love of all things "messy," Del's office was surprisingly neat and tidy. I was confused by this juxtaposition until I realized that the order in his office allowed visitors to notice the important things. To me, the most important was a simply hung photograph of our dear friend Del surrounded by his beloved, inspired and inspiring students.

That is the Del Harnish I remember and celebrate.

Student-Centered Learning: Subversive Teaching in a Standardized World

1. H_2O is not water

Harold B. White, III

H_2O is not water. For that matter, neither is "water". These coupled, seemingly nonsensical statements that I had written on the board before class perplexed a large majority of my biochemistry students. Discussion among students of the meaning of the statements introduced them to the unfamiliar pedagogy of Problem-Based Learning. They were about to encounter this new way of learning after years of experience with traditional, information-dense, stand-and-deliver science courses to which they had become

comfortable. While the symbolic chemical formula, H_2O, conveys information of importance to a chemist, there is much more to the substance we call water, and personal experience influences individual perceptions. As Korzybski emphasized, "the word is not the thing." Consider the differing perceptions of "water" by a biochemist, an environmental engineer, a meteorologist, a sailor, a farmer, a limnologist, a sanitation worker, an architect, a swimmer, a parent, a politician, an Inuit, or a Bedouin? A more nuanced understanding of "water" develops with experience, discussion, and exposure to different perspectives. Likewise, learning biochemistry

or any other subject involves learning and communicating in the language of the discipline. We construct meaning, and that influences how we think, work, and behave.

Our individual perceptions of "education" vary even more widely than our perceptions of "water", which, at least, is a recognizable substance. What constitutes "good" or "bad" education depends on the goals, methods, and experiences of the perceiver. Half a century ago, in the midst of the social unrest accompanying the Vietnam War, Neil Postman and Charles Weingartner's perception of education resulted in their scathing criticism of education as practiced in the United States at the time, as outlined in their book *Teaching as a Subversive Activity*. They advocated student-centred pedagogy in which learning emerged from students engaging problems relevant to them and society. Students would learn how to learn through the process of asking questions and pursuing relevant knowledge, independent of particular disciplines or assertions by authority figures. This would prepare them for decision making in a rapidly changing world in which the future could not be anticipated.

Education exposes students to new objects, processes, concepts, and ideas that all have words associated with them and, in turn, expand the realm of thought. Knowing goes beyond simple definitions. To think and participate in any discipline requires knowledge and use of its language. Providing definitions to memorize, like "a colorless, transparent, odorless liquid that is the basis for the fluids of living organisms," is insufficient. Students must use words in context and internalize the nuanced meanings associated with them in order to communicate effectively with others who also have similar (but not necessarily identical) understanding. "Student-centred education" means different things to different people, but it shifts the focus from "teacher-centred education" to learning rather than telling.

Knowledgeable, independent thinkers threaten the status quo. They challenge the politics of their parents, question the beliefs of their religious leaders, evaluate the qualifications of candidates, expose unfair practices, disregard most advertising, and are willing

and open to consider alternatives. Little wonder that those in positions of power are suspicious of and wish to silence minds that question. According to Postman & Weingartner (1969), the purpose of education should be to create an environment that cultivates independent thinkers. Such goals were radical 50 years ago and are still radical in many quarters today. However, numerous teachers now practice constructivist, student-centred pedagogy that aligns with much of the "subversive" agenda.

One of many quotable quotes in *Teaching as a Subversive Activity* is "...once you have learned how to ask questions—relevant and appropriate and substantial questions—you have learned how to learn and no one can keep you from learning whatever you want or need to know." Regardless of the discipline, the curriculum should have this single goal. As expressed by Postman & Weingartner (1969), every course should expect students to liberate their curiosity, ask substantive questions, and develop refined "crap detectors."

Imagine a course in which the instructor places a glass of water in front of the students and asks them to generate 100 questions, evaluate the substance and quality of those questions, and use them to guide a semester of study? I think that Del Harnish would be excited about such a course.

References

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

2. Can Student-Centred Learning Be the Key to Improving Patient Care?

David Harris

I confess that I did not know Dr. Del Harnish, but I have gained an understanding of him from the written words and respect of his colleagues. Dr. Harnish was a true believer in student-centred learning, and he lived it through his work in the BHSc program at McMaster. In the commentaries, it is clear that Dr. Harnish aimed to prepare his students for the uncertainty, troubles, and opportunities that were so aptly outlined in *Teaching as a Subversive Activity*, written almost 50 years ago (Postman & Weingartner, 1969). This led me to ask myself, "are we in medical education doing enough to prepare future physicians for the uncertainty they will face in the future?"

Although the field of medicine seems to be fully alive with uncertainty, I was blind to this concept for many of my first years teaching physiology at a medical school. My first interaction with this concept (although I did not recognize it at the time) took place in the classroom when I observed a very successful nephrologist and hypertension specialist respond "I don't know" to a student question. Up until that moment, I don't believe that I had seen any faculty member make such a statement in front of medical students—at the time, most of us viewed this type of uncertainty as chum in the water for an upcoming feeding frenzy. Despite my presumptions, the circling sharks did not appear. Although I would not have termed it "uncertainty" at the time, I learned as a junior faculty member that it was okay to say "I don't know".

My first formal introduction to the world of uncertainty took place at a conference where Dr. Andrew Olsen spoke about the

topic. In his presentation, he spoke about a young female patient who had right upper quadrant pain. Her parents took her to several physicians and the running diagnosis of a gallstone was considered. Ultrasounds were ordered to confirm the presence of stones, but no stones were visible. All other symptoms were supportive of this diagnosis, and the surgeons pushed ahead despite emptiness in the gall bladder; they were certain she needed surgery. During the surgery, the patient had a severe hemorrhage that the surgeons could not control, and she died. She was less than 18 years of age. As a new father of two young girls, this story hit home. This death resulted from the inability to say "I don't know what is wrong" and the inability to recognize when one must slow down in clinical decision making. As patients, we hope that our doctor or our child's doctor is confident. However, confidence can be tenuous in in the face of uncertainty.

The challenge is how to teach our medical students to realize the uncertainties that percolate through medicine on a daily basis. I teach early in the medical school curriculum, before any patient care exposure and where diseases are presented in a virtual case on a computer monitor. Most of our curriculum is still focused on content delivery rather than developing thought processes. The primary method of assessment at my school, and many others, is the United States Medical Licensing Exam-like multiple choice question; this prepares students for Step 1 of the exam, which is one of the most influential determinants of their residency application. At least one major issue arises from this approach—this exam tests only one domain, knowledge. There is little uncertainty because the answer is either wrong or right. Where, then, do students learn about other important domains such as critical thinking or problem solving? In the current medical school environment where we feel as though we must cover every disease for the student, I would argue that the answer lies in finding alternative ways to promote student-centred learning.

A quote from a colleague of mine, an educational psychologist, has served as my foundation for teaching. She states simply that "if you

as a faculty are working harder in the classroom than your students, they are probably not learning." (Note, this does not include the preparation work done behind the scenes!). My feeling is that lecture is by far the most common pedagogy occurring in medical schools today. The standard lecture (faculty-centred) is the extreme example of the faculty doing the majority of work. Students are not testing their mental models of a process or struggling with a concept. As stated earlier, faculty tend to retreat to this method, driven by the need to provide content and the perception that the standard lecture is the most efficient way to do this. The ever-expanding content in the field of medicine also severely limits the opportunities for student-centred learning and any ability to introduce uncertainty.

So, how do we transition to student-centred learning in medical education? Interestingly, I believe that faculty will be forced to transition if they haven't already. Not by Deans, accrediting bodies, or other administration, but by the numerous resources that are quickly becoming available for students. Currently, there are numerous companies that are able to deliver content in presentations that are high quality, efficient (student can view in 2x mode), and provide recall or USMLE-like questions relevant to the content. Many faculty feel threatened, viewing these resources as their "replacement". I feel that these external resources will actually allow faculty more time to focus on higher order thinking (what educator doesn't desire this?) or clinical reasoning. These resources should also provide faculty time to highlight their experience and show the true uncertainties that their job deals with on an everyday basis. Activities should be developed that have more than one right answer. Let students realize that most choices we make in our lives and careers do not always have "right" answers.

Ultimately, we need to realize that faculty are not the "gate keepers" of knowledge as they were in the past. Medical educators must shift the responsibility of learning to the learner. To do this, we must have confidence that the students will be able to "get" something without us feeling the need to tell them everything. Let

students use more efficient content delivery methods to buy them time. This frees time for faculty to share our greatest asset, experience. Who knows? This just might give students the time to explore new, improved methods for optimizing patient care, which should be a goal for all.

References

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

3. Shifting our Value System: Using Student-Centred Learning to Battle the Standards-Based World

Joshua Koenig and Ashley Marshall

> *"There have been plenty of days when I have spent the working hours with scientists and then gone off at night with some literary colleagues. I mean that literally. I have had, of course, intimate friends among both scientists and writers. It was through living among these groups and much more, I think, through moving regularly from one to the other and back again that I got occupied with the problem of what, long before I put it on paper, I christened to myself as the 'two cultures'. For constantly I felt I was moving among two groups—comparable in intelligence, identical in race, not grossly different in social origin, earning about the same incomes, who had almost ceased to communicate at all, who in intellectual, moral and psychological climate had so little in common…".* C.P. Snow, *The Two Cultures*, 1959 [1]

Authors' Positionality

Joshua Koenig is a doctoral candidate studying at the McMaster Immunology Research Centre. He instructs courses in the Bachelor of Health Sciences program including: Introductory Immunology, Cell Biology, and Child Health. Josh sees the enduring fjord between science and the humanities and aspires to embody what C.P. Snow described as the bridge between "two cultures." Josh's expertise comes from his experience as a student and educator at an Ontario university.

Ashley Marshall is a professor of communications at Durham

College, who obtained both a B.A. and M.A. from McMaster University. With the mentorship of Henry Giroux, Ashley's research is rooted in public intellectualism and public pedagogy. Ashley's humanities expertise widens the conversation about student-centric learning by conceptualizing intersectionality, neoliberalism, and equity. Ashley's analysis comes from her position as a faculty member in the Ontario community college system.

Can one truly promote student-centred learning in a standards-based world?

No.

In this essay, we will define what we call student-centred learning, some of the key standards used to evaluate education, and who benefits from them. Lastly, we will explore how education perpetuates the standards-based world and discuss the potential that true student-centred education has moving forward.

What is student-centred learning?

In 1993, Alison King, then associate professor of education in the College of Education at California State University in San Marcos, gave a polemical review of where the focus should lie in teaching and learning, claiming that instructors should be less of a "sage on the stage" and more of a "guide on the side [2]." Since then, this conversation about the role of the instructor has continued and been reframed. Student-centred learning is the opposite of "teacher-centred learning," where the instructor is the "sage on the stage" who harbours information and is entrusted to disseminate their wisdom to a (usually large) classroom of students. In contrast, student-centred approaches shift the focus of education from the instructor to the students. In student-centred models, instructors are viewed as facilitators who encourage and empower students to gain skills in self-directed and peer-to-peer learning. Student-centred approaches value hard and soft skill development and allow students to pursue their interests (not the instructor's), and

generally oppose learning to strict curricula or standardized evaluation criteria—adaptations of the Socratic teaching method. The 20th century ushered in pedagogical theorists who sought to re-integrate the Socratic method into the educational system and laid the foundation for what we know as constructivism, or specifically, "student-centred learning." This movement had many forerunners (bell hooks, Maria Montessori, Paulo Freire, Neil Postman, John Dewey, etc.), and was primarily inspired by a need to assuage power imbalances, autocracy, and oppression within the learning environment. So, when attempting to define student-centred learning, we must also acknowledge an important tenant of its origin: these forerunners prioritized injection of democracy, equality, and subjectivity—inherently radical social objectives. Therefore, it is pertinent to label student-centred learning as borne from social justice.

What are the standards/metrics and what do they represent?

Please note, we use standards and metrics synonymously throughout the text below.

Institutional Metrics

In April 2019, the incumbent Ontario government handed down their expectations for Ontario higher education funding. According to The Globe and Mail, "Ontario's new performance-based funding model for colleges and universities will focus on 10 metrics that include employment and graduation rates, the amount of research and industry funding the institutions receive and the demonstrated skills of their students [3]." These metrics are loosely defined and still quite young—their impact in the classroom is yet to be seen—and therefore they will not be a focus of critique here. However, what we *can* glean from this change to higher education metrics is the ideology which led to their introduction: according to Minister Merrilee Fullerton, there is a "need to have performance-based funding and outcomes funding in order to keep the economy

going the way it needs to go, allowing students to find jobs[2]." This "outcomes" deliverable is what makes the college system attractive to some students and to some employers: there is an applied learning and a hands-on methodology that aids students who learn best this way. Meanwhile, the university system is often characterized as being "too theoretical," or "too abstract" for the "real world," which is echoed in the ideology behind these changes to funding.

As educators, which we would define as *lifelong students*, supporting the economy and ushering students toward finding jobs is a gross devaluation of higher education. For education to come even remotely close to being student-centred, the endgame cannot be employment, or employment alone. If education that "keep[s] the economy going the way it needs to go" is needed, then as a society we must also realize, explicitly, that we are workers first and people second. Is such a Manichean [4] divide even possible? Because we are analyzing "metrics," the humanity of the students drops out of the equation: they are regarded as tuition dollars first, instead of curious, passionate, embodied people with real experiences and with material engagement with economic structures such as capitalism, racism, precarity, poverty, disability, and myriad oppression. So, with that, we assert that students are also people. We assert that Ontario's "performance-based" metrics do not account for the human-aspects of the student experience.

Looking at the equation more closely, we realize that under today's market logics, at the level of the institution, profit margins are the main tool used to evaluate educational programs. At the university level, students pay tuition, tuition goes to administration, administration pays the instructors, instructors teach the students. Sage-on-the-stage education delivered to large classes is, therefore, financially valuable to the institution (and prioritized above humanism, dialogue, intellectualism, or social transgression). The instructor salary for a single course can accumulate profit through many hundreds of heads of tuition dollars. In contrast, student-centred education is typically delivered in small classes

and therefore is a less viable educational structure from a profit perspective. Charting a student's progression takes time and energy from instructors. Establishing goals with students and evaluating their progress requires one-on-one time with students that is not possible as class sizes grow. Evaluations are typically not as simple as massified multiple choice questionnaires—creativity and curricular development are required. Constant re-evaluation of courses to match students' needs requires dedication and legwork. All these activities require time and are therefore expensive, and again, deprioritized. Efforts to massify student-centred learning are presently a focus of educational research but, ultimately, most of these efforts fail. From our view, this failure occurs because student-centred learning is not meant to be massified. By this metric, student-centred education fails the standards-based world.

There is a complicated argument to be made: sage-on-the-stage education can produce profits that can be used to offer other very important social services to students, like hiring support workers for mental health services, hiring academic advisors to guide students, or even to support smaller student-centred programs that may not be as lucrative on their own. Further, in Canada, profits are used to hire scientists who generate societally valuable research. Nonetheless, the institutional and government metrics applied to education today are capitalist metrics that are used as an argument to provide a lower quality of education and to dissuade students from pursuing interests that motivate them in favour of those perceived to be economically beneficial.

Individual Metrics

The standards that students strive for are generally 1) grades, 2) a degree/diploma, and 3) employment. Grades are utilized as a "sorting" mechanism, in which an employer, scholarship granting agency, professional school, etc. can presumably judge the value of a person (or as some would impassively put it, the "quality of a candidate") based on their grade scores. To this day, grades are used as a "realistic" metric for student success. And yet, grades are a relatively poor predictor of job success [5]. Our own institutions,

which utilize grade-based evaluation, mistrust the output of grades from high schools and are reported to assign multipliers to "correct" student grades to ensure students from schools are "equally competitive" for acceptance to their premier programs [6], which raises the question: why do we think this is a valuable metric at all?

A lesser discussed issue is the social side of grading. From various perspectives, the education system perpetuates oppression against many demographics. For example, a prevalent notion remains that students who experience disability are not meant for the university environment. We have heard stories like the following, told numerous different ways and many times over: a colleague of ours likened a student with disabilities to a short basketball player. From their view, a short basketball player stands no chance of making it to the NBA. This colleague's worldview dictates that some people are born for basketball, others are not, and that is how it should be. Students with alternative learning needs, in this analogy, should not have equal access to education—something that is their legal right in Canada (see AODA [7]).

Contrary to our colleagues' assertions, short players continue to have integral roles in the NBA. Muggsy Bogues, Isaiah Thomas, Kyle Lowry—all players well below the league average of 6'7" and often considered "too short for basketball"—have had stellar careers in the NBA. They have succeeded *in spite* of their "limitation," for example, through their ability to shoot the ball and set up plays. Further, they succeed *because* of being short through the additional benefits of being quick, agile, and able to move in ways that their taller peers cannot. Similarly, students with disabilities are present and, in fact, many excel in higher education. These students have found ways to succeed despite their disabilities, and sometimes despite lapses and barriers in institutional support. However, the institution has done little, if anything, to consider the added value these students have *because of* their disability; students with disabilities offer unique perspectives and desirable skill sets that should be represented in academia and professional spheres. Present models of evaluation are not equipped to deal with this nuance, especially considering

that for many instructors, we are still at the stage of othering marginalized perspectives as "unfit for the institution." Addressing these concerns is increasingly pressing as the number of students with alternative needs is increasing at an exponential rate in higher education (Figure 1).

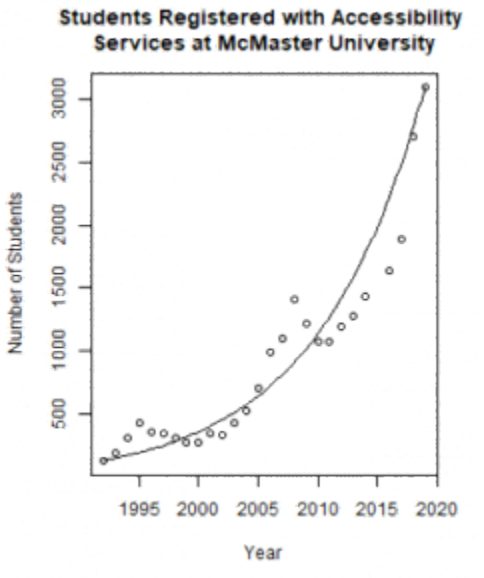

Figure 1: Number of students registered with McMaster University's Student Accessibility Services over time. These data could have many explanations including: increasing support for students with alternative needs in high school, increased awareness for diagnosis, or potential increases in mental health disorders. Data collated from Ministry Reports [Available at: https://sas.mcmaster.ca/ministry-reports/].

A very similar story could be told about people of colour, queer folk, members of minority religions, women-identified individuals,

and low-income populations, all of whom are still subject to systemic oppression that limit their engagement in higher education. As an example, the class of medical students accepted in 2016 at the University of Toronto had only one Black student in a class of 259 (0.4%) despite nearly 9% of Torontonians self-identifying as Black [8]. These are oppressed communities who have useful skill sets and experiences but live an existence outside of what the institution is designed for, who need accommodation, and yet must compete for the same metric: grades. Despite the adversity that these individuals face, the A+ they receive is valued as equal to any other A+, context largely ignored. Conventional wisdom dictates that students who do not achieve high grades are not as intelligent as their peers and are not as deserving of scholarships, coveted co-operative education placements, nor jobs. But we assert, through our experience, that the students who achieve an A+ are not always smarter, more deserving, more dedicated, or better members of society. Those who have a privileged place in society, those who don't need to work while being in school, aren't at risk of sexual abuse, who can move freely without discrimination, who do not have to dedicate significant mental faculties to their social position, are oriented to excel in higher education. They achieve high grades, and continue their social ascent, having already started with an advantage. Grades, as a metric, do not work for everyone. Grades fail hard-working students.

As educators we have relegated experiences to a "personal" sphere, which is expected to remain compartmentalized and distant from "learning." This model ignores the thoughts, emotions, experiences, traumas, and successes of the student—the very essence of what engages them in humanity. Rejecting this model, forerunners of student-centred education have argued that the individual as a whole, not just as a student, should be at the centre of their (life-long) educational experience. This is where student-centred education fails, again, in a world of fetishized metrics. How do we reasonably evaluate a student's experiences? What is an A+ in working through trauma? What grade do we give someone when

they incorporate new content into their existence? What is the grade value of developing a new, intangible skill such as compassion? We advocate for broader conversations about "alternative assessments," with the hope that these nuanced and intersectional approaches, which are largely rooted in Indigenous practices, become more mainstream and more respected. Instead of "alternative," our ambition is that collaborative evaluation, discussion circles, inquiry (asking questions perhaps without finding answers), recognizing "traditional knowledge keepers" (Elders) as experts, and other forms of authentic assessment become part of faculty development.

In summary, we have discussed how standards/metrics are systematically valued, and then used to evaluate both educational programs and their students. We have also pointed out, from a theoretical and social perspective, how these metrics continue to fail students. We think, therefore, that the question should shift from "can we promote student-centred learning in a standards-based world?" to "what are we presently doing to promote the standards-based world?" and "how might a revolution of values impact institutions?"

What are we doing to promote the standards-based world?

Marshall MacLuhen famously wrote "the medium is the message" to explain how the "character" of a medium can have a greater impact on the individual than the content conveyed through the medium [9]. While MacLuhen applied this primarily to post-modernism and its media, such as newspapers, radio, and television, Postman and Weingartner expanded the theory to include the classroom as a medium. They deduced "…that the critical content of any learning experience is the method or process through which the learning occurs [10]." When we consider the current process of higher education, it is quite clear how standards remain at the forefront of society. No matter what educators tell students about taking their

classes seriously, getting out what they put in, and encouraging students towards deep, interest-based learning, the output of most (if not all) higher education programs is some form of metric: institutional profit, employability, grades, and diplomas/degrees. The process of learning is largely ignored, students are expected to be proficient in the same material, to demonstrate that they can regurgitate that material, but with no real follow up that they have truly *learned* that material. The system, especially in teacher-centred education, tells these individuals to maximize effort on achieving standards and minimize effort into any other aspect, especially in actually "doing work." The institution outlines the rules of engagement, the terms of success, and the conditions of a student's exit. The students have minimal (if any) say in these matters.

Our institutions host students during important, formative years in their intellectual development and, even in the most student-centred of programs, instil in them a confining ruleset. The medium has told them that their agency for change is low and that conformity is ideal. These students, alienated [11], relegate into the periphery any need to critique everyday life and renew humanity with critical thought. They become absorbed into a system which dictates what is acceptable; a machine, from the outset, governed by standards. Standards become normalized, even expected. These same students go out into the world, vote, perpetuate the importance of "employability" and "performance-based funding," without critically evaluating who wins in these systems and who continues to be left out (or, in more blunt terms, oppressed). They become the citizenry incapable of seeing themselves as either part of a larger problem or having the potential to be a part of a solution. After all, they are workers, not people. Our educational institutions are a fundamental reason that the standards-based world exists.

What can we do about it?

To challenge the "standards-based world" requires a revolution in values, difficult critical thought, and dialogue at the level of the institutions who, as they have historically done, should guide the intellectual revolution. The academy—every faculty member, every staff member, administrator, teaching assistant, and student—are members of society. If these individuals continue to believe that the present standards are static, that there is no alternative, then it will continue to be so.

As we have argued, this metrics-based world actively excludes, devalues, and hinders its populace and therefore must be changed. The answer, we propose, is a shift in the medium. By engaging in student-centred, non-compartmentalized, feeling, thinking, experiencing education, we are telling students, through the medium, that they are not simply workers but instead are individuals whose experiences are valuable. It tells individuals that they are an integral part of society who can enact change, and that a part of that change can be to shift value away from broken metrics. As Henri Lefebvre has said, "Our age is, in especial degree, the age of criticism, and to criticism everything must submit. Religion through its sanctity, and law-giving through its majesty, may seek to exempt themselves from it. But they then awaken suspicion, and cannot claim the sincere respect which reason accords only to that which has been able to sustain the test of free and open examination [12]." The free and open examination that Lefebvre seeks of institutions which hold influence is the same free and open examination we desire both *of* and *in* academies of higher learning. A belief in the status quo is a powerful mysticism that allows for these metrics and standards to remain inert. However, it is through Othered knowledge that the academy is becoming increasingly critiqued, and it is from the labour of these marginalized students and their allies that a reform of what students learn, and how they learn it, is on the horizon.

We will reiterate the first word of this essay: **No, *true student-***

centred learning cannot exist in a standards-based world. This is by design; it was never meant to. We propose this world is not desirable and suggest the use of student-centred learning as a radical tool to promote a shift in values towards dismantling the standards-based world.

AM would like to acknowledge Russell Means, who taught her that "Marxism is as alien to [her] culture as capitalism" too, and showed her how to be an ally to the Indigenous peoples. In honour of Means's memory and in observance of Othered knowledges and what we can learn from them, what we can teach, AM champions Black oral traditions while also echoing Means: "…I detest writing. The process itself epitomizes the European concept of 'legitimate' thinking; what is written has an importance that is denied the spoken. My culture, the Lakota culture, has an oral tradition, so I ordinarily reject writing. It is one of the white world's ways of destroying the cultures of non-European peoples, the imposing of an abstraction over the spoken relationship of a people." AM also thanks her tireless team, The Rhizome Project: *Kristen Shaw, Julia Theberge, Natasha Kowalskyj, Kevin Taghabon, and Tyler Pollard.*

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References

[1] Snow, C. P. (Charles Percy), 1905-1980. (1959). The two cultures and the scientific revolution. New York, NY: Cambridge University Press.

[2] King, A. (1993). From sage on the stage to guide on the side. *College teaching*, *41*(1), 30-35.

[3] Friesen, J. (2019, April 19). New metrics for Ontario university and college funding include employment and graduation rates. The Globe and Mail. Retrieved from https://www.theglobeandmail.com/canada/article-new-metrics-for-ontario-university-and-college-funding-include/

[4] Referring to Manichean religious beliefs about duality. Typically, about a good, spiritual world of light and an evil, material world of darkness. Read as "is such a black and white divide even possible?"

[5] Roth, P. L., BeVier, C. A., Switzer III, F. S., & Schippmann, J. S. (1996). Meta-analyzing the relationship between grades and job performance. *Journal of applied psychology*, *81*(5), 548.

[6] Cain, P. (2018, September 13). One university's secret list to judge applicants by their high schools – not just their marks. Global News. Retrieved from https://globalnews.ca/news/4405495/waterloo-engineering-grade-inflation-list/

[7] Accessibility for Ontarians With Disabilities Act, 2005, SO 2005, c 11, <http://canlii.ca/t/52pzh> retrieved on 2019-11-28

[8] Statistics Canada. 2016. Census Profile, 2016. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Version updated June 2019. Ottawa. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E, Nov 28, 2019.

[9] McLuhan, M. (1964). *Understanding media: The extensions of man*. New York, NY: McGraw-Hill.

[10] Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

[11] "By making alienation 'the key concept in the analysis of human situations since Marx', Lefebve was opening philosophy to action:

taken in its Kantian sense, critique was not simply knowledge of everyday life, but knowledge of the means to transform it" (*Critique of Everyday Life*, 6).

[12] Kanapa, J. (1947) *Henri Lefebvre ou la philosophie vivante*. La Pensee, no. 15.

4. Designing Activities and Assessing Student Learning in the Flipped Classroom

Chaya Gopalan

My teaching career started with the traditional podium-style lecture, using chalk and a blackboard, just like I was taught. I soon realized that my approach had to change, as I was influenced by the body of evidence suggesting that lecture alone is not an effective way to promote deep and lasting student learning (Haxhiymeri & Kristo, 2014; Johnson, 2011; Lang, 2014). The lecture-based method of teaching has proven to be less engaging than inquiry-based education (Butzler, 2014; Larsen *et al.*, 2019; Persky & Pollack, 2011; Rawekar *et al.*, 2013; Simonson, 2014). Studies suggest that the lack of mechanisms to ensure intellectual engagement with the lecture results in a decline of student concentration after 10 to 15 minutes (Haxhiymeri & Kristo, 2014). Moreover, traditional lectures are not well-suited for teaching higher-order skills, such as application, analysis, and synthesis (Huxham, 2005; Young, Robinson & Alberts, 2009). An evidence-based, student-centred classroom that is rich in opportunities for collaboration and active learning contributes to student success (Freeman *et al.*, 2014; Johnson, 2011; Kuh, 2007). Influenced by the literature, my peers, and educational conferences, I soon incorporated informal group activities and formative assessments into my teaching.

Recent advancements in educational technology, access to an increasing volume of scientific information, and a shift in expectations among millennial learners call for an alternative instructional approach (Johnson & Romanello, 2005; Mangold, 2007; Smith, 2014). As educational technology was transforming, I embraced the opportunity and became an early adopter of learning

management systems, computerized exams, and lecture capture devices, among others.

Student-centred learning strategies have been shown to mitigate the limitations of the standard transmittal model of education by promoting student engagement and improving knowledge retention (Clark *et al.*, 2011). Thus, the informal group activities that I once used as active learning techniques were replaced by formal, team-based learning activities. The use of team-based learning in the classroom was clearly engaging to the students. However, it also posed a new problem—not having enough time to cover the content, especially in my content-heavy health sciences courses. As I searched for a way to alleviate the constraint of time, a solution surfaced: the flipped classroom.

The flipped classroom revolves around assigning content in the form of readings, recorded lectures, and practice questions prior to class sessions. Students have their first exposure to content on their own, and class time is spent applying their new knowledge to real world situations. The in-class portion of flipped teaching (FT) offers an opportunity to work closely with students and explain particular questions in different forms to provide students with a multi-faceted approach to learning. The FT method also offers peer teaching, which is yet another opportunity for students to learn the content. FT is a hybrid educational format that shifts traditional lectures out of class, freeing up class time for student-centred learning. In this model, the students are first exposed to lecture content in their individual space (outside of class) using instructor-provided study materials such as guided readings and lecture videos. Later, under the guidance of the instructor, clarification, review, and problem-solving occurs in the group space (the classroom). According to the underlying theory and empirical studies, the FT model helps to overcome several challenges related to traditional lecture-based teaching. In a didactic lecture setting, students may be hesitant to ask questions, they may be multitasking, or they may not capture all of the key details because of the lack of repetition or the inability to type/write at speed

while processing the information. In the FT mode, on the other hand, students may access content anytime from anywhere, and they can pace themselves by re-watching a video or revisiting the content. Thus, by allowing students to learn challenging material at their own pace, FT prevents cognitive overload of new information (Clark *et al.*, 2011). Furthermore, FT provides a great opportunity to engage students in critical thinking through application, analysis, and synthesis, especially because the pressure of content coverage is now shifted to outside of class (Krathwohl, 2002; McLaughlin *et al.*, 2014; O'Flaherty & Phillips, 2015). Furthermore, FT repetitively introduces concepts, thus bolstering student preparedness and student engagement in learning (Estes *et al.*, 2014). The FT model is particularly helpful for students who are struggling to learn difficult topics (University of the Pacific, 2019). Overall, the FT method expects the students to be active participants in the course.

The NMC Horizon Report: 2014 Higher Education edition selected FT as one of their near-term technologies that are expected to achieve widespread adoption in one year or less (Johnson *et al.*, 2014). Team-based learning and case-based learning, when combined with FT, are among other approaches that not only maximize student learning but also to help students develop positive interdependence, accountability, and skills in communication and collaboration.

Retrieval is the reclamation of information that improves knowledge and strengthens skills through long-term meaningful learning (Karpicke, 2012). Repeated retrieval through exercises involving inquiry of information in a variety of settings and contexts is known to improve learning, and the FT model allows an abundance of repetition (Balota *et al.*, 2006; Fritz *et al.*, 2007). One crucial part of the FT model is in the design of class activities to engage students in learning and critical thinking (McLaughlin *et al.*, 2014; O'Flaherty & Phillips, 2015). Another key factor that determines the success of FT is whether students complete pre-class assignments to immerse themselves in their in-class activities.

Pre-Class Activities

The utilization of resources by students typically meets significant resistance (Hessler, 2017). Students have a tendency, in general, to not complete pre-class assignments. Many factors can contribute to why students avoid taking advantage of their pre-class resources. Students may lack interest, motivation, or time to fulfill pre-class requirements, especially if the content is too challenging or not appealing. In addition, spending several hours outside of class towards pre-class resources requires self-discipline, good time management skills, and time commitment. The lack of time commitment from students results from being accustomed to the traditional lecture-based approach (Saumier, 2016). Even when the amount of work expected of them does not vary between teaching methods, students may perceive an increase in their workload with FT (Kember, 2004). Thus, the amount of work that students feel they must put into a FT course to succeed might be higher than the amount of work that they believe is necessary to keep up and to achieve the same outcome in a regular course (Deslauriers *et al.*, 2019). The barriers to student preparedness could be overcome by designing activities that are challenging but achievable, including course content that is relevant and linked to their success, a positive atmosphere, and clear communication of student expectations (O' Flaherty & Phillips, 2015). Assuming that students are successfully utilizing resources before their in-class session, the carefully designed active learning strategies in the classroom create opportunities for deeper understanding through application and analysis of the content.

A low-stake assessment helps instill a sense of accountability and encourages students to complete pre-class assignments. Primary factors to focus on for the pre-class content's assessment is to test factual details and to remain on a knowledge level of Bloom's Taxonomy (Krathwohl, 2002). Assessments of pre-class content could come in a variety of formats but are commonly quizzes, worksheets, or questions embedded into the lecture video that the students are expected to utilize in their preparation for in-class work.

In-Class Activities

The assessment of pre-class content not only provides a glimpse of student preparation but also reveals the topics with which the students typically struggle. Instructors must review students' pre-class performance prior to scheduled class time to discuss those topics with which the students struggled. In addition, instructors should open the floor by providing an opportunity for students to identify topics that were not clear to them. Discussing those topics will allow more time to explain difficult topics in-depth. This review activity during face-to-face meetings also provides the chance for the instructor to reach out to students if they are not participating in the pre-class assignments.

The primary focus of FT is not only on pre-class assignments and assessments, but also on the in-class activities and assessments in which students will partake. Using this approach, instructors can guide students into a deeper understanding and comprehension of the material. Whereas pre-class assessments are meant to facilitate lower-order learning, in-class assessments and discussions focus on higher-order learning. Teachers who have had experience with FT recommend to not add more lecture material than originally planned during the scheduled in-class time (Hessler, 2017). With students coming prepared using pre-class content, it may seem like there is more time and that class can move along more quickly. Instead of adding extra content, however, one now has time for interactive in-class activities, discussion, and assessments at a more in-depth level.

In-class activities and assessments can take a variety of forms, such as discussing a case study, using clicker questions, problem sets, building a model, and many more. In addition to the delivery of course content, the active learning that takes place in the classroom shifts the focus from the teacher to the student and to student engagement with the material. Through active learning techniques and modeling by the teacher, students shed their traditional role as passive receptors by actively participating while attaining knowledge and skills; as a result, they are able to apply their

knowledge and skills more meaningfully (Haxhiymeri & Kristo, 2014). Many studies have used group exercises in class (Gopalan, 2019; Gopalan & Klann, 2017; Hessler, 2017). Group work provides opportunities for students to meaningfully discuss, listen, write, read, and collaborate on the content, ideas, and issues of a specific topic.

Evaluation of Flipped Teaching

It is recommended that teachers collect students' feedback on how students felt during the new process of learning in the FT method. A qualitative student survey early in the semester allows students to voice their concerns. It is not uncommon for faculty to become discouraged when asking students for their opinion early in their experience of an FT course, but this feedback is valuable because of its ability to provide information that can help improve the process. It can also offer new information that was not originally anticipated. Indeed, the topic of evaluations often brings more questions than answers. Finding valid and reliable evaluation tools to measure the effectiveness of FT may be a challenge. The use of standardized exams, such as unit exams, midterms, finals, and board exams, will most likely continue to be the mainstream evaluation method for student knowledge outcomes (Kuh *et al.*, 2005).

With the appropriate design of pre-class and in-class assessments, instructors will have a greater chance of conducting a successful flipped classroom. Dedication, being open to feedback, and allowing enough time to prepare materials appropriately is crucial to success. With continued research on how to properly implement successful FT, this approach could soon become the norm for all students and faculty, just as it is for me.

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References

Balota, D.A., Duchek, J.M., Sergent-Marshall, S.D. & Roediger III,

H.L. (2006). Does expanded retrieval produce benefits over equal-interval spacing? Explorations of spacing effects in healthy aging and early stage Alzheimer's disease. *Psychology and Aging* 21: 19–31.

Butzler, K. B. (2014). Flipping at an open enrollment college. ACS *CHED CCCE* 1–17.

Clark, R. C., Nguyen, F. & Sweller, J. (2011). *Efficiency in learning: Evidence-based guidelines to manage cognitive load.* New York, NY: John Wiley & Sons.

Deslauriers, L., McCarty, L. S., Miller, K., Callaghan, K.,& Kestin, G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences* 166: 19251–19257.

Estes, M. D., Ingram, R. & Liu, J. C. (2014). A review of flipped classroom research, practice, and technologies. *Higher Education* 4: 7

Fritz, C. O., Morris, P.E., Nolan, D. & Singleton, J. (2007). Expanding retrieval practice: An effective aid to preschool children's learning. *The Quarterly Journal of Experimental Psychology* 60: 991–1004.

Gopalan, C. (2019). Effect of flipped teaching on student performance and perceptions in an introductory physiology course. *Advances in Physiology Education* 43: 28–33. doi:10.1152/advan.00051.2018.

Gopalan, C. & Klann, M.C. (2017). The effect of flipped teaching combined with modified team-based learning on student performance in physiology. *Advances in Physiology Education: in press.*

Haxhiymeri, V. & Kristo, F. (2014). Teaching through lectures and achieve active learning in higher education. *Mediterranean Journal of Social Sciences* 5: 456.

Hessler, K. (2017). *Flipping the nursing classroom: Where active learning meets technology*. Burlington, MA: Jones & Bartlett Learning.

Huxham, M. (2005). Learning in lectures do 'interactive windows' help? *Active Learning in Higher Education* 6: 17–31.

Johnson, A. (2011). Actively pursuing knowledge in the college classroom. *Journal of College Teaching and Learning* 8: 17–30.

Johnson, L., Becker, A.S., Estrada, V. & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, Texas: The New Media Consortium.

Johnson, S. A. & Romanello, M. L. (2005). Generational diversity: teaching and learning approaches. *Nurse educator* 30: 212–216.

Karpicke, J.D. (2012). Retrieval-based learning: Active retrieval promotes meaningful learning. *Current Directions in Psychological Science* 21: 157–163.

Kember, D. (2004). Interpreting student workload and the factors which shape students' perceptions of their workload. *Studies in Higher Education* 29: 165–184.

Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice* 41: 212–218.

Kuh, G.D., Kinzie, J., Schuh, J. H. & Whitt, E. J. (2005). *Assessing conditions to enhance educational effectiveness*. San Francisco: Jossey-Bass.

Kuh, G.D. (2007). What student engagement data tell us about college readiness. *Peer Review* 9: 4.

Lang, J. (2014). Learning on the edge: Classroom activities to promote deep learning. Retrieved from https://www.facultyfocus.com/articles/effective-teaching-strategies/learning-edge-classroom-activities-promoting-deep-learning/

Larsen, C.M., Terkelsen, A.S., Carlsen, AM.F. & Kristensen, H.K. (2019). Methods for teaching evidence-based practice: a scoping review. *BMC Medical Education* 19: 259. https://doi.org/10.1186/s12909-019-1681-0

Mangold, K. (2007). Educating a new generation: Teaching baby boomer faculty about millennial students. *Nurse Educator* 32: 21–23.

McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M. & Mumper, R. J. (2014). The flipped classroom: A course redesign to foster learning and engagement in a health professions school. *Academic Medicine* 89: 236–243.

O' Flaherty, J. & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education* 25: 85–95.

Persky, A. M. & Pollack, G. M. (2011). A modified team-based learning physiology course. *American Journal of Pharmaceutical Education* 75: 204.

Rawekar, A., Garg, V., Jagzape, A., Despande, V., Tankhiwale, S. & Chalak, S. (2013). Team based learning: A controlled trial of active learning in large group settings. *Journal of Dental and Medical Sciences* 7: 42–48.

Saumier, L. P. (2016). Improvements of the peer-instruction method: A case study in multivariable calculus. *Electronic Journal of Mathematics & Technology* 10: 137–153.

Simonson S.R. (2014). Making students do the thinking: Team-based learning in a laboratory course. *Advances in Physiology Education* 38: 49–55.

Smith J.S. (2014). Active learning strategies in the physician assistant classroom-the critical piece to a successful flipped classroom. *The Journal of Physician Assistant Education* 25: 46–49.

University of the PACIFIC. (2019). Retrieved from https://www.pacific.edu/about-pacific/newsroom/2019/may-2019/flipped-classroom–luke-lee.html.

Young, M. S., Robinson, S., & Alberts, P. (2009). Students pay attention! Combating the vigilance decrement to improve learning during lectures. *Active Learning in Higher Education* 10: 41–55.

5. Student-Centred Learning

Jonathan Kibble

When I was in grade school in England in the 1970s and 80s, children were still mostly supposed to be seen but not heard. A swift punishment would often correct the errors in our ways, though the nicer teachers also rewarded our compliance. Teachers and textbooks were our source of knowledge, and their truths were rarely up for debate. This was a learning environment shaped by classical behaviorist learning theory. In 1969, the year before I was born, Postman & Weingartner published *Teaching as a Subversive Activity*. They envisioned an educational world where learners learned through asking questions ("Inquiry Learning"), with the goal of developing skills to solve real-world problems. Graduates would enter the world with a keenly developed "crap detector" in order to be engaged citizens, thriving in a world full of existential threats.

In Postman & Weingartner's time, communism and nuclear war were high on the list of Western worries. In our post 9-11 world, these fears have changed to things like terrorism, climate change, and pandemics, but the case for learning to solve a good problem seems just as urgent. One seismic difference in today's learning environment is how learners receive their information. I was always vexed about the risk of biased information coming from a mass media controlled by a few powerful men. Today, our learners have been liberated by the internet and its social media. Avalanches of information are delivered any time, any place, anywhere. Our new dilemmas are massive information overload, soundbite analysis, and polarization of viewpoints. In this new order, it strikes me that the need for one of those old "crap detectors" is more urgent than ever!

After high school, I began a lifelong habit of avoiding the real world as I went straight off to medical school. There, I literally received wisdom. Lecture upon lecture of wisdom. Looking back, drinking from that fire hose of knowledge largely prevented me

from thinking for myself until well into the 1990s. At about that time, I got a scholarship to take a year out of medical school to complete a Bachelor's degree. It was my first encounter with research, which led me next into a Ph.D. program. For the first time in my educational journey, I was confronted with the need to determine the direction of my own work, to ask questions, and to try to figure out the answers. I was finally doing some of that Inquiry Learning! It was a process that permanently changed who I am. I emerged with the confidence and ability to frame my own questions. I can find good information and assess its validity. I can draw evidence-based conclusions. I can usually work well with other people. Most importantly, I can passionately disagree with you and we can still be friends! Did I have to do a Ph.D. to experience these things? Today, I am a professor in a medical school. My roles have included being responsible for fostering Inquiry Learning, or what we now might call "student-centered learning." This has been a pathway filled with both joy and pain—and a steady loss of hair!

So, what is student-centered learning? For me it is simply a philosophy that prioritizes the needs and interests of students. Compared to traditional programs, learning is more personalized. Students are allowed to set some of the learning agendas. They experience authentic learning activities, meaning that they get to tackle some real problems in real situations. Student-centered learning commonly includes a lot of social learning in teams. Faculty shape the process and spend more time giving feedback than lectures. The theoretical basis here has switched to social constructivism. Students build new learning on their prior learning. With the help of their teachers, learners internalize the knowledge and skills of their environment. Students take responsibility for their own learning and eventually gain autonomy. Shouldn't be too hard, right?

For this piece, I was asked to comment on whether one can truly promote student-centered learning in a standards-based world. This gets at the idea of barriers, and one of them is certainly our conventional views on assessment and standards of achievement.

My world is indeed constrained by externally imposed standards. Most of my learners are pre-clinical medical students who must get a great score on the United States Medical Licensure Exam (USMLE) Step 1 knowledge test to secure a good residency job later on. My other students are pre-med students who are taking the Medical College Admissions Test to enter medical school. All of these learners have their eyes firmly fixed on the prize of doing well on a standardized test. Doing wholesale student-centered learning in this environment is tough. There is a powerful informal curriculum that often drives the expectation that faculty should simply tell students what they need to know. Exposing these strategic learners to the sometimes messy and seemingly inefficient world of Inquiry Learning can place your teaching evaluations in peril! In this environment, my suggestion is to find the right dose of the medicine.

Much of the time we can easily align with the students' most proximal goal of passing their external test. We can at least use active and engaging learning pedagogies to help them master the core of knowledge. Instead of just lectures or readings, we can infuse short videos, games, simulations, case problems, collaborative exercises, and the like. We can also use authentic experiences to foster learning of other key competencies that are not on The Test. For example, I can tap into a medical student's emerging professional identity and have them work some of the time with real patients. Here, they may need to resolve an ethical dilemma, demonstrate reasoning skills to make a diagnosis, or master communication skills to give bad news. There is still good alignment with their ultimate goal of being a clinician, and there is engagement with a real-world problem. We can also reserve part of the overall curriculum footprint for project-based learning or research. In this part of the program, students can follow their own passion and be guided to experience the component parts of the discovery process. Even if you are teaching in a program where conventional knowledge standards are prominent external

requirements, the curriculum can still prioritize lifelong learning skills by including inquiry and discovery.

Another challenge in our standards-based world is the narrow traditional viewpoint on how to fairly assess students. The notion of producing an "equal" assessment when we might have one hundred students all doing a different project is not as hard as it first seems. Rubrics that clearly describe the generic elements of hypothesis or question development, information gathering, study design, data collection, data analysis, and interpretation are readily available. After all, life is not a multiple-choice exam (though it is a cumulative one)! Speaking as someone who has given workshops on how to develop excellent multiple-choice exams, I am as much a fan of a good reliability coefficient as the next person, but a more creative mindset is needed to assess student-centered learning outcomes. To assess learners as they develop competencies, best practices include a shift to more frequent, low-stakes assessment with rich feedback about progress. Triangulating several measures over time allows us to determine when students have achieved competence.

This leads me to final thoughts about the challenges we face as faculty in delivering more meaningful learning. Another great prompt for this piece was, "will respecting an individual student's autonomy as a learner still do justice to all other students, particularly in a world of limited resources?" Part of this we have already discussed—the need to create equitable assessments when students are each doing their own projects. My other thought relates to faculty resources, both in terms of faculty number as well as how we are deployed. There is no doubt that our ability to guide students through the inquiry process is more resource intensive than the traditional information-delivery mode of curriculum. A common issue is simply an adverse faculty-to-student ratio, which at some point does become limiting. These days, faculty spend a lot of time serving compliance systems such as accreditation, financial audit, effort reporting, research ethics, conflict of interest, grant reporting, and a growing list of metrics needed for knowledge managers to assure our excellence. While all of this is well

intentioned, it takes us away from our primary missions of teaching and research, and it consumes a lot of human resources that are no longer available to deliver education. My advice is to stop filling out all those forms, as it only encourages them! More seriously, faculty need to be advocates for the education mission at every opportunity, from long range strategic planning to annual budget allocations.

It is not just about the number of faculty but also whether we and the institution both buy in to the idea of student-centered learning. Maybe you are strong enough to be a maverick who can swim against the tide. I did not know them, but I imagine that Postman & Weingartner and the late Del Hamish, who inspired this collection, probably fit this mold very well. Hopefully, you don't need to be an outlier and your institution already values or even requires Inquiry Learning. Successful transition to student-centered approaches needs good faculty development. We were not raised as professional educators and many of us had those old behaviorists as our role models. We need help to rethink and redesign learning activities, to become better facilitators, to give effective feedback, to assess differently, and so on. Organizational buy-in has several other facets. Institutional values have to be apparent through actions like how we schedule classes, the facilities and resources provided, and the credits available for the work. This prevents a hidden curriculum from developing that pays lip service to, but undermines, student-centered learning efforts. Leadership needs to be supportive of the faculty engaged in this effort so that faculty are liberated to take some risks without the fear of risking their own career advancement, especially if student evaluations dip. We can do excellent student-centered education, even with limited resources, but alignment of philosophy from the curriculum committee, leadership, faculty, and students makes it so much easier.

Fifty years after Postman & Weingartner, we have made progress. In the intervening years, we have seen blue ribbon reports like *Vision and Change in Undergraduate Biology Education: A Call to Action* make specific recommendations for a shift to student-

centered classrooms and for the inclusion of real-world research experiences into the curriculum. Have we fulfilled all of the vision yet? No. But it is no longer subversive to expect that all our learners will graduate with the ability to think and advocate for themselves in a complex world. Over the last 10-15 years, I have met many faculty with the necessary passion and skills to deliver such an educational outcome. In honor of Del Hamish, and the others that came before us, let's keep moving onwards and upwards together!

References

Bauerle, C., DePass, A. & Lynn, D. ET AL. (2011) *Vision and Change in Undergraduate Biology Education: A Call to Action*. Final Report of a National Conference Organized by the American Association for the Advancement of Science, July 15–17, 2009, Washington, DC. Washington, DC: American Association for the Advancement of Science.

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

6. Can One Truly Promote Student-Centred Learning in a Standards-Based World?

Damien Joseph

Can one truly promote student-centred learning in a standards-based world? In theory, no, this would not be possible. The individuals that comprise a classroom are diverse beings with different experiences and interests. Accordingly, we wouldn't expect everyone to have the same aptitude for the different subjects that we evaluate. Nor should we want this—this is the beauty of student-centred learning. If we are serious about this mode of learning, then we need to do away with standards as we know them. Why belabour the budding physicist with having to excel in English class? Or the passionate artist with chemistry lessons? We all have a natural proclivity for certain things over others, so why not focus on honing the craft we enjoy?

In fact, student-centred learning better fits the world that we are heading towards. That is, as occupations become increasingly automated, there will be a shift towards more creative-based work. And the best way to inform work like this is by drawing upon the unique experiences and lessons that each person possesses. Let each student learn of their own volition and discover for themselves the things that intrigue them. This is how we cultivate life-long learners—by showing them how fun and wondrous an endeavour learning can be.

Not to mention, just because a student may initially be put off by a certain subject, it does not mean that they will never explore it for themselves in the future. As we pursue our interests, we soon discover that there are innumerable threads that connect each interest to other, seemingly disparate, things. For example, the

artist who initially detests all things mathematical may find themselves enraptured by the ubiquity of the golden ratio within nature. Then, they may choose to learn more about it to further inform their own artistic works.

However, if we force everything down the throats of students and expect them to be good at everything from the get-go, they may learn to simply hate the things they aren't immediately good at and avoid these things like the plague. We must avoid this at all costs—especially when grades are a metric upon which many students hinge their self-esteem. As the saying goes, "if you judge a fish by its ability to climb a tree, it will spend its entire life believing that it's stupid."

That being said, there is a tremendous amount of value to be derived from an education where one is exposed to all the different areas of study—especially considering that change is a pervasive part of our lives and we may realize that what we initially thought we wanted to pursue was in fact misguided. In this scenario, having a broad education provides an excellent platform to reassess the direction one wants to follow. Using standards that apply equally to everyone is not the way to go about this.

Ideally, we would work with each student to develop a unique education plan for them that would account for their unique aptitudes for different subjects and would allow them to cultivate the hidden potential within them. This would address the problem of students who have trouble picking up a subject being left behind and students who excel being held back from learning at a higher level than what is being provided.

We need to teach students how to think and learn for themselves; not how to learn for a test. We need to teach them how to think critically about problems and find ways to be more creative. Students are losing motivation because they're far removed from the education they are getting. They aren't learning for themselves, and the knowledge they gain seldom persists past the exams they write.

The current standards-based education system that is peddled is

archaic; it is an artifact of times long past. The world is changing at a rapid rate while our education system is frozen in time. What use is education as we know it if what we learn is outdated by the time we graduate?

7. Student-Directed Learning—Central to a Medical Student Education

Debra L. Klamen

As I began to reflect on the role of student-directed learning in a standards-based world, as Senior Associate Dean of Education and Curriculum at Southern Illinois University School of Medicine (SIUSOM), I immediately began to think about its role in medical education–surely a standards-based environment if ever there was one.

My first emotional response was, "What is its role? Essential!" "Can/Should we promote it? Absolutely!" I hope by the end of this short article you, the reader, will agree with me.

To talk about student-directed learning, one must first define it, and to do so I will borrow its four main definition points from the Glossary of Education Reform (1). After each component of the definition, I will include why each piece must be actively included in modern medical school curricula to meet the needs of future physicians and the patients they will serve. Short examples will be included where relevant.

Definition of student-directed learning:

1. *Teaching and learning is personalized, meaning that it addresses the distinct learning needs, interests, aspirations, or cultural backgrounds of individual students.*

Future physicians must be self-directed, life-long learners, who are able to solve problems on their own, and in short amounts of time. Addressing specific interests and aspirations of future physicians keeps them motivated through the seemingly endless bytes of

material they must learn. Further, medical students are an intelligent and talented group of individuals. Allowing students' space to follow their own interests throughout medical school training will push even the most talented student to continue to learn and improve. Medical schools should attempt to diversify their class rosters because a varied group of physicians is needed to treat an increasingly diverse world. Acknowledging and addressing these cultural backgrounds in medical school is therefore crucial.

2. *Students advance in their education when they demonstrate they have learned the knowledge and skills they are expected to learn.*

Medical education is becoming increasingly competency-based, meaning that time to graduation might become more variable, but the basic competencies of a graduating medical student must be tracked and met, by graduation, by all students (or they should not graduate). Medical students must learn material deeply, not simply to pass a test or get a good score on the United States Licensing Examinations, but because the grade is not the end to the learning process. Physicians must use, continue to learn, and retain knowledge in order to better treat their future patients. A teacher-directed learning style may help them rotely memorize lots of data points, but the data is sure to be forgotten after the examination.

3. *Students have the flexibility to learn "anytime and anywhere," meaning that student learning can take place outside of the traditional classroom and school-based settings.*

An essential need of medical education is to get students out of classrooms and into clinical experiences (both with real patients and those that are standardized). For example, these activities begin at SIUSOM in the first week of medical school. Standardized patients, computer-based simulations, and clinical experiences allow sufficient time for students to become critical thinkers and enable them to reflect on their experiences. This experience is critical for

a physician's ability to continue to learn and grow throughout his/her career. The effort (put forth by the students) and the trust (by the instructor that the students will learn in this manner) is a model (2) that will be used throughout residency training as well. Thus, it should be experienced in medical school early on as students are beginning to form their own professional identities.

4. *Students are given opportunities to make choices about their own learning and contribute to the design of learning experiences.*

Choices about learning are critical to future physicians because they will be making these choices for the rest of their careers. For example, SIUSOM has a variety of such opportunities, including self-designed research time in years one and four, 15 weeks of a "Personalized Educational Plan" in the third year of medical school (3), and an entire fourth year of Electives (self-designed and otherwise). Students also need the opportunity to try out and refine their ability to be leaders. Leadership is not explicitly taught in coursework, but it is an essential skill for future team leaders. For example, a group of senior medical students at SIUSOM researched, designed, and now teach a "coachability" curriculum that is given in years one and two.

Too often in educational settings (medical school and otherwise), the need for organizational efficiency is emphasized to the detriment of efforts to enhance student learning. There are always arguments for efficient teaching (lectures to a passive audience), but there is often a failure to reflect on whether these methodologies are actually effective. Medical education needs to enable student-directed learning through a culture of creativity, innovation, and a deep and rich appreciation for the teaching and learning processes themselves (4). This culture, widely apparent at SIUSOM, is undoubtedly one of the reasons we have been asked to contribute to the commentary on this important topic, and we are honored to do so.

References

1. Student-Centered Learning Definition. The Glossary of Education Reform. https://www.edglossary.org/student-centered-learning/ Accessed October 4, 2019.
2. Adams S, Bilimoria K, Malhotra N, Rangachari PK. Effort and trust: the underpinnings of active learning. *Adv Physiol Educ* 41:332-337, 2017.
3. Klamen DL. Getting Real: Embracing the Conditions of the Third-Year Clerkship and Reimagining the Curriculum to Enable Deliberate Practice. Acad Med 90:1314-1317, 2015.
4. Cuneo C, Harnish D, Roy D, Vajoczki S. Lessons Learned: the McMaster Inquiry Story from Innovation to Institutionalization. New Directions for Teaching and Learning, no. 129, Spring 2012. Wiley Periodicals, Inc. Published online in Wiley Online Library (wileyonlinelibrary.com). Accessed October 4, 2019.

8. Problem-Based Learning and Student-Centred Learning—a Perfect Match!

David C.Y. Kwan

Fifty years ago, in 1969, the American astronaut Neil Armstrong likened his first steps on the moon to one giant leap for mankind. In the same year, the newly established medical school of McMaster University in Canada made a small step towards student-centred learning, adopting an innovative learning philosophy termed "problem-based learning" (PBL). This marked a big leap in higher education worldwide. I was quite lucky to have had first-hand experience with PBL at McMaster during my 30-year career as a faculty member there (1978–2008). I also spent two decades (including two separate leaves of absence in Hong Kong and Taiwan) in Asia promoting PBL education. This year, marking the 50th anniversary of the official establishment of PBL, an international health science education journal invited me to contribute a manuscript about PBL development in Asia (probably because of my "notorious reputation" as the "Godfather of PBL in Asia"). The article that I wrote took on a somewhat disappointing tone, A *Thorny Path: The Developmental Course of Problem-Based Learning for Health Sciences Education in Asia.* In 2016, I also wrote a wake-up call paper for a regional journal, *Five decades of skepticism about* PBL *in medical education: a reflection and outlook in the Asia Pacific context*. Yes, I have been quite concerned, because PBL represents a revolutionary pedagogical approach characterized primarily by student-centred learning, using simulated real-life scenarios as the socially accountable learning platform. Perhaps student-centred learning is too vague a concept, making it difficult to pinpoint its true significance. Its role is certainly not as crystal clear as teacher-

centred learning, especially for people who grow up and are educated in the comfort zone of the teacher-centred learning culture. To many, student-centred learning loosely refers to a fuzzy assortment of teaching strategies. I have heard people say that structured teaching by expert teachers is really "for the good of students" and thus qualifies as a form of student-centred learning. I have also heard people say that student-centred learning gives students full license to do what they want and "fulfil their satisfaction".

Based on what I know and have read about student-centred learning, I feel that student-centred learning can be defined by the following principles:

1. Instruction in student-centred learning addresses the distinct learning needs, interests, aspirations, or cultural backgrounds of individual students, i.e., student-centred learning is personalized learning.
2. Students apply actions and take initiative to search for learning strategies to handle problems, i.e., student-centred learning is a form of active learning.
3. Students are given opportunities to make choices about their own learning strategies and they contribute to the design of learning experiences, i.e., student-centred learning is definitely self-directed learning.
4. Students advance in their education when they demonstrate that they have acquired the knowledge and skills they are expected to learn, i.e., student-centred learning is outcome-based learning.
5. Students are expected to take responsibility for their learning progress and should be able to reflect on and evaluate their own learning, i.e., student-centred learning is a type of reflective learning.
6. Students must realize that education in the classroom is best utilized by flipping from teaching to learning, i.e., student-centred learning is a flipped classroom education.

The above six principles are in good alignment with what is expected of students in PBL (and by this I mean authentic PBL, not the hybridized and distorted PBL that arises when teacher-centred learning characteristics begin to overtake student-centred learning). Like student-centred learning, PBL has also been criticized for being vague. To provide clarity, I helped to define PBL, once again using six principles that I call the 6-S principles: student-centred learning and self-directed learning are the learning attitudes; small group learning is the format; scenario-based learning is the learning platform; and support-oriented learning and self-reflective learning are the forms of learning facilitation. Effective integration in the application of these operating principles holds the key to the ultimate learning outcome for the learner (i.e., life-long learning).

PBL has remained the most innovative and effective educational concept in the health professions (not just medical education) for nearly half a century, since its official inception at McMaster University in Canada in 1969. The originally proposed philosophy of PBL, commonly referred to by the PBL forefathers as the "McMaster Philosophy", has stood firm amidst many contemporary medical educational theories over the last half-a-century, attesting to its time-proven, humanistic, and inherently multi-strand solid foundation. In fact, PBL gave rise to the theoretical basis and the working framework for the subsequent emergence of project-based learning, case-based learning, team-based learning, outcome-based learning, flipped classroom learning, and interprofessional learning, all of which have inherited the characteristics of PBL and student-centred learning to varying degrees. None of these learning strategies, however, encompass all six of the guiding principles of student-centred learning mentioned above. Thus, PBL is the only true student-centred learning strategy.

That said, how do I justify "The thorny path…" and "…the skepticism…" in the papers I referred to earlier? Let me share the following e-mail discussions to make my point. Robert Chen of the Universiti Tunku Abdul Rahman (UTAR) at Kuala Lumpur wrote an

e-mail message to the e-mail discussion group formed by the Asia Pacific Association of PBL in Health Sciences, in which he suggested that case-based learning be used to describe one type of student-centred learning (especially in medical education). He questioned, "Is there not any reason and movement to start shifting our focus from PBL to case-based learning? Particularly since there are some significant disadvantages of PBL, such as: 1) students encounter the case with 'blank' information, and (more importantly) 2) during the 'follow-up discussion' where students are to share their 'home work', that in most cases, this second session ends up being a 'presentation' rather than a discussion." He rationalized his view by pointing out that 'presentation' means that students take turns giving a 'mini-lecture' using PowerPoint, with the lights out. As a result, group members, including the tutor, get bored and begin to dread this part of the second session. This type of "lights-out" presentation occurs in lieu of an active session in which students actively discuss or debate with each other the merits of the 'presenting' student's information. Robert soon took the fire from Nemuel Fajutagana, who served as the Dean of the Medical School at the National University of Philippines and is currently the Chair responsible for organizing the upcoming Asia Pacific PBL conference to be held in Cebu in 2020. Nemuel responded to Robert's first issue, "I do not believe that students will ever be in a situation where they will encounter a case with 'blank' information … The first issue can easily be addressed by constructing triggers appropriate to the level and requirement of the course." To the second issue, Nemuel responded, "This can happen to any method. This is not generic to PBL. This is not a failure of PBL but rather a failure in facilitating PBL sessions." I concurred with Nemuel and wondered why Robert considered cased-based learning to be student-centred learning, and why he felt that PBL was essentially teacher-centred learning. In fact, what Robert observed in the PBL process represents a typical case of compromised PBL conducted in a deviated environment that is not aligned with student-centred learning because of poorly trained teachers. This misunderstanding

further attests to the importance of understanding the concept of PBL and its relationship to student-centred learning. Qualified faculty development activities appear to be essential and mandatory in schools that wish to entertain a student-centred learning strategy. In my PBL workshop, I always emphasize that students should NOT divide amongst themselves the learning objectives that arise from group brainstorming discussions around the problem, and that, in the next session, they should NOT take turns presenting select information using PowerPoint (a teacher-centred behavior that emulates teachers' teaching). However, I still see this approach—which takes PBL off-track at the expense of student-centred learning—in action in classrooms today. David Fairholm of the University of British Columbia commented in his e-mail message: "PBL, teacher-centred learning, and case-based learning are all small group learning/teaching methods—each with its strengths and weaknesses, supporters and detractors, benefits and hindrances … However, PBL distinguishes itself in that it is the learning method of life, it is truly student-centred—the students decide what they must learn, then learn it, then share it with colleagues, then apply it … As a result, it has become a world-wide educational movement because of these student-centred learning features. One often refers to PBL schools but does not read or refer to case-based learning schools even though these are common instructional methods with basis in sound educational science."

I rest my case.

9. Student-Centred Learning: Possibilities and Challenges

MacPherson Institute

McMaster has an institutional history of teaching innovation, with students figured centrally in the pedagogical practices, assessments, and outcomes of learning. The formation of problem-based learning in the health sciences in the 1970s (and other pedagogies considered disruptive at the time) may seem like standard practice now. This history illuminates McMaster's robust legacy of student-centred learning as an approach rooted in the belief that students are not passive subjects, but rather that they share the responsibility of learning with teachers and other students.

Writing from the perspective of a teaching and learning center, we have seen some of the promise of what student-centred learning can bring. We have seen instructors shift the balance of power within their courses, partner with students to co-create curriculum, and express a genuine commitment to developing a more equitable teaching and learning environment. We recognize that student-centred learning, in its focus on outcomes, has the potential to offer meaningful impact for equity-seeking and historically marginalized students. We have also seen students challenge instructors or institutional hierarchies and demand better learning experiences. We believe the university should be a space where learning deeply matters, and we are committed to supporting teaching and learning communities that seek to enhance and enrich the student learning experience.

And yet, we have seen, participated in, and replicated some of the challenges of student-centred learning. In this piece we explore some of these challenges in an effort to open a conversation on the complexities of student-centred learning and the risks of assuming

that it is a universal good. We cannot give each of these challenges the full treatment in the context of this essay, but we welcome additional conversations on these topics within the campus community.

Many of the challenges of student-centred learning are outside of the influence of individual instructors or McMaster as an institution. At the provincial level, students tend to be seen as consumers and workers in the renewed interest in standardization, metric analysis, and funding, which are founded on student employability and student perceptions of marketable skills. In this vision, the revolutionary impulses of student-centred learning—the focus on student agency, participation, and partnership—are at risk. Instead of seeing the purpose of university education as fostering curiosity and exploration, this model of education prioritizes metrics and jobs over inquiry. That is to say, student-centredness becomes conflated with employability. This conflation dilutes student-centredness of its potential for equity, instead replacing this potential with a focus on transferable skills, job readiness, and work-integrated learning. This is not at all to say that these employability intentions are themselves a problem; rather, the concern is that, in shifting the meaning of student-centredness from one of emancipatory potential to one of employability, the power of the pedagogy for transformative change is, if not lost, then compromised.

Some of the challenge comes in how the 'student' in student-centred learning is imagined. Often, the 'student' is imagined as a universal person who is a white, male, straight, cis, able-bodied settler. We know that many instructors actively challenge this conceptualization, and we urge everyone to think carefully about who is excluded when a universalized 'student' is offered in the idea of student-centredness. This is not simply a problem of language; it also has implications for classroom practices. Take, for example, active learning: heralded and evidenced as a best practice in student-centred learning, this approach, if it is not coupled with a nuanced understanding of the rich diversity inherent in 'student,'

can pose unique physical and social barriers for some students—English language learners, students with disabilities, and racialized, Indigenous, and 2SLGBTQ+ students, for example, who may be excluded from classroom group work dynamics. The imperative within student-centredness is to recognize the unique background and experiences of every student; the risk is in forgetting this diversity and instead teaching—even while following absolute best pedagogical practices—as though *all* students will benefit equally from an active learning approach.

While the nuances of student-centredness in classroom practice may be one for individual instructors to take up, there are distinct challenges to student-centredness for programs and the institution. For an academic program, meaningfully integrating student-centred approaches requires comprehensive program design and continual adaptation to learning conditions and student needs. For the institution, rather than simply highlighting student-centredness in marketing materials and strategic documents as a way to signal to students, taxpayers, and government the responsiveness of the institution, the institutional community must couple these claims with policy, practice, and cultural change. Together, we must also reward and recognize instructors for taking up the possibilities of student-centredness and acknowledge the labour required to realize these learning conditions. Without sufficient faculty supports and meaningful recognition for all categories of instructors, student-centred pedagogies not only add to the over-taxation of instructors but may also preclude instructors from benefiting maximally from the germ of possibility inherent in student-centred learning.

Finally, in our roles we often hear faculty concerns about the relationship between student-centred learning and 'student entitlement'; that is, there is sometimes faculty resistance around the power that student-centred learning affords students and the potential that this power could diminish rigour and standards. In this way, student-centred learning places students and faculty in opposition to one another, with a real risk that those most impacted

by this conflict may be students from equity-seeking groups who are seeking access to legislative entitlements or genuinely accessible learning environments. Instructors, too, are at risk when students feel they can evaluate teachers against certain student-centred benchmarks and then *use* their experiences against the instructor (e.g., through biased course evaluations). We also recognize that not all instructors experience power in the classroom in the same ways. For instructors from equity-seeking groups, student-centred learning may hold greater risk, increase demands for care labour, and diminish the recognition of knowledge.

Our thinking in this piece has shifted from the question "*Can one truly promote student-centred learning in a standards-based world*?", which implicitly celebrates student-centred learning as all-good, to one that recognizes its complications. In the same way, standards are not all bad and so too are complicated. For example, the "standards-based world" language may have a negative ring to it, but some of these standards are what have contributed to the ability of various equity-seeking groups to access post-secondary education in the first place.

What we need, then, is much greater specificity about what we mean when we say 'student-centred,' who we include in our vision of 'students,' what counts as 'learning,' and how we imagine student-centred learning should take place in the context of courses, programs, and at McMaster. This specificity would afford us, as a campus community, the confidence to take up student-centred pedagogical approaches with a clear rationale and a deliberate anticipation of what risks must be mitigated in doing so. Specificity about student-centred learning would ask us to think about the implications of this meaning on policy and practices, and whether and how we are collectively willing to make change. We invite you to ask yourself what student-centred learning means to you: what it promises, what it risks, who it includes, and who it forgets.

In this call for specificity, we want to end with an acknowledgement of all those instructors and students at McMaster

who have and are taking seriously the challenge of student-centred learning—a pedagogy that asks for equity, for a disruption of power in teaching and learning, and for shared responsibility. We are inspired and hopeful because of these instructors and students, and we see the work they do. Our work at the MacPherson Institute is to see that all programs and instructors at McMaster are afforded the opportunity and support to realize a vision where teaching and learning deeply matters. We want to hear from you: mi.mcmaster.ca.

10. Student-Centred Does Not Mean You Do Not Have to Put on Clothes

Mathew Mercuri

Educators are (or at least were traditionally) assigned the responsibility of determining what students ought to know and how that information should be delivered (i.e., they are assigned the task of teaching). "Student-centred" learning shifts that responsibility to the student. In this student-centred model, there is explicit consideration of the student's interests, her preferred approach to learning, and what sort of feedback she finds valuable. Students are not always in the best position to know what they should know in order to meet their learning goals, hence the purpose of formal education. These opposing frameworks present the challenge of balancing what the teacher believes the student ought to know to obtain the desired education (or achieve the stated learning goal) and what the student, in fact, wants to know (which may or may not be comprehensive or relevant to their desired goal). Anyone who has taught a statistics course has likely encountered this challenge! Thus, there is inherent tension between the roles of teacher and student.

A possible solution may lie in Bertrand Russell's suggestion of how learning can be optimized by building lesson plans around the individual student's interests. For example, a student's interest in aviation offers several opportunities for tailored education—physics and mathematics lessons can focus on examples related to engine design and the dynamics of flight, and writing and language skills can be explored through an examination of the history of aviation. This is a strategy we often use in teaching graduate statistics, whereby the student applies statistical concepts to her own projects

that will make up a dissertation as part of the assessment and evaluation. Russell had the opportunity to put his views on education into practice with the opening of the Beacon Hill School. The story goes that when a local Rector visited the school at Telegraph House, he was greeted by a naked little girl. When the Rector cried, "Good God!" the child replied, "There is no God!" and shut the door. Maybe that is a bit too student-centred!

The story of the Rector and the little girl is most certainly a myth. However, the idea that a student's learning can benefit from considering that student's interest in devising a curriculum is not. Russell was responding to an environment where education was decidedly not-student centred, where education was delivered predominantly through didactic lecture and assigned reading of classic texts—the instructor decided what the student should learn and how. Today, the idea that learning is enhanced through tailored assignments and readings is intuitive to both educators and students alike, and yet, such tailoring often does not occur, often due to a lack of resources and/or a lack of imagination (or other reasons, including disinterest of either the teacher or student, or both).

Whereas in the past it was assumed that students sought higher learning as a means of personal growth (perhaps in a moral sense, i.e., growth through hardship), the students of today more often view a university education as an investment in improving the opportunity for increasing future earnings. Such an environment reconceives students as consumers, and, as the saying goes, the customer is always right. Education positioned as a transaction may require that it be student-centred. In that case, it may be that the role of the teacher will inevitably shift to that of a facilitator, thus relieving the tension. Why one would object to this shift in roles is odd to me. I learn nothing from my own lectures, and I find repeating myself year after year a bore. What is the point if the students feel the same way? I have found that, where I have tailored assignments to my students' interests (e.g., in my undergraduate course on healthcare, the topic of the research protocol they need

to design is not restricted to a problem in healthcare), I often learn something new from my students. If we are to encourage lifelong learning, which is something I hear is of value to most professors and is coincidentally a feature of a student-centred model, then it should not be problematic for us to lead by example.

11. Self Direction Amid a Poverty of Attention: Beyond Satisficing and Feigned Expertise

Krish Bilimoria

Fifty years ago, Postman & Weingartner (1969) understood that the educational conventions of their time would be insufficient for the students of 2019. Their work encouraged us to think about how we might prepare students with strategies for a future whose only constant is change. Self-directed learning in the flavours of McMaster's Bachelor of Health Sciences Program (BHSc, Class of 2018) have been my limited exposure to a curriculum that has attempted to inoculate students against educational inertia. In the same romantic sense as Postman and Weingartner, Assistant Dean Del Harnish believed, with quiet and steadfast confidence, that students could meaningfully direct their own learning. I owe the better faculties of my reasoning and my expanded sense of what is possible to the provocation of educators like Del. However, despite sharing similar sensibilities for relentless self-education, I cannot help but recognize two looming spectres for students entering such programs: a proclivity to satisfice when faced with educational challenges, and a feigning of expertise. I share these thoughts because, in an information age, self-direction will require a voluntary return to rigour of effort and thought amid a poverty of attention.

In my experience, peers with well-established but flexible ways of knowing through didactic forms, problem solving, and repeated self-reflection exceed outstandingly in a self-directed curriculum. To meet the needs of courses offered through the broader

university, such students are able to memorize for coursework, all while being able to share confidence in addressing new problems and reflecting upon their practices in cases of failure. This trifecta usually involves a high degree of self-motivation because their explicit curricula merely serves as the starting line for their sustained learning. In practice, I have noticed that self-direction devolves readily into self-indulgence. Students make 'satisficing' decisions, particularly when there are palpable competing interests to one's curricular education and surrounding extra-curricular activities. Some students satisfice and short-change their own educational experience by identifying where their effort might be sufficient to arrive at their ideal grade and then redirect their efforts elsewhere. For example, in a biochemistry inquiry course, in our learning of how streptomycin may bind to the 30S ribosome, it is comforting for students to settle at answers at a level of explanatory depth availed to them by a well-written textbook or review article. The ensuing steps of learning the pharmacokinetics of streptomycin from the primary literature may be less comforting, and this level of exploration is often avoided. Decisions like these demonstrate a kind of bounded rationality articulated by Herbert A. Simon, which may explain how the 'efficient' student juggles a seemingly broad, diverse portfolio of extracurriculars at the expense of perseverance through difficult problems (Simon, 1969). I describe this kind of person so critically because I am this kind of person—and I have been reflecting upon ways I might change, to better support myself to think and work towards difficult, thorny problems in a process of protracted struggle.

In an information age, the satisficer leverages a swath of secondary analyses to generate what might appear to be an original opinion. On closer inspection, this is an exercise in feigning expertise. For like-minded students afflicted with diverse educational agendas, conflicted allegiances to different bodies of knowledge make it challenging to identify what ought to be learned, and when. While I learned laterally across disciplines such as bioinformatics, ethics, and global health, I grappled with the feeling

of being an imposter in each of these communities. Dancing between different disciplines, without the habit of mind to appreciate the rigour of a single discipline, my attention was divided among different academic communities. This behaviour was encouraged when I could feign expertise by sharing the researched basics of an argument to a tutor with limited expertise in this area. The relative knowledge gradient impressed upon others a rigid foundation to this knowledge, encouraging me and my peers to feign expertise. I became aware of my own delusion of competence when I attempted to speak about Nietzsche to a Nietzsche scholar, who had steeped themselves in both the historical and intellectual milieu of Nietzsche's work. I realized that reading a series of secondary articles and cursory conversations on his philosophy could only cheaply emulate an expertise developed through persistent thought and struggle. For learners in 2019, the ease with which we can share half-baked opinions like my own makes it necessary to critically appraise such claims. I fear such appraisal is generally instructed to encourage students to evaluate the work of others, instead of directing such attention inwards.

I continue to share Del's belief that students might be able to direct their own learning. I continue to hope that both students and faculty recognize the looming challenges of challenging students to persist consistently along paths of higher rigour—and higher learning—when satisficing may appear at first to be sound. In the words of economist Herb Simon (1969),

> "in an information-rich world, the wealth of information means a dearth of something else—a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that it might consume."

These are challenges that both students and faculty in 2019 will have to face together—against the sequela of purposefully depriving

ourselves the attention to direct our learning. At risk is a status quo of misinformation from satisficed learning, shared by people with feigned expertise.

References

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

Simon, H.A. (1969). Designing organizations for an information-rich world. Brookings Institute Lecture. Carnegie-Mellon University.

12. Semper Discens

Brian D. D'Monte

Years ago, when asked to give my first lecture to undergraduate medical students in biochemistry, I realized halfway through that most of them seemed to have lost interest.

It was then that I devised a method to encourage them to attain—on their own—whatever it was that I had been trying to get across to them so that they may get motivated to learn it better. I split the class into three groups and asked each to select a group leader. I then handed each group a set of learning objectives that were hinged around a short clinical history of three patients. The learning objectives reflected information that our departmental faculty felt was important to attain. At the same time, I made it clear to each group that they had the freedom to change and substitute these learning objectives with others of their choosing, and that they were free to go about this on their own. The groups were encouraged to contact senior students (undergraduate or postgraduate) or any member of faculty (in the clinical or basic sciences), to consult books in the library, and to access any other learning resources they wished. When they finished, they would come back to the lecture room on the scheduled date to present their findings. I told them that I would also come if they wanted (or needed!) me, but that they were welcome to conduct the session by themselves. They wanted to know whether all subsequent sessions would be conducted in similar vein, to which I replied that I sincerely hoped so, but that I would have to abide by the ruling of the academic administration.

The students suggested that I come for the first session. I did and was astounded by the fervor displayed and the enormous collaborative effort that the students had made. They asked that I plead for all lectures to be replaced by similar sessions. When I asked why, they enthusiastically responded "it was interesting to

find out things by ourselves," "function as a group", "occasionally disagree for a common goal", "we now realize the relevance of biochemistry to our training to become a doctor", "it was more fun than listening passively to a lecture", "we loved the freedom given to us to explore other issues not spelt out in the syllabus", "we respected the trust shown to us as adults", "we found it fun to seek information from books and to interact with other students and faculty".

In the second phase of my medical school training, one department had a system of student seminars wherein we had to prepare and deliver, in 45 minutes, a topic of our choice to the rest of the class; I chose antihistaminic drugs. To this day, this topic remains one of my favorite subjects in Pharmacology, and it is one that I remember best.

Forward to many years later. As a tutor in a medical school practising a problem-based learning (PBL) curriculum, I used to stress that learning ought to be enjoyable, and students were quick to take me literally. One day they suggested that their tutorial sessions should be conducted outside the medical school premises. The first tutorials were held in my flat, and later, in restaurants (once in a Hard Rock Cafe, where the other customers complained of the noise we were making—this in spite of the loud music!). Sometimes tutorials were held as a prelude to a movie, but wherever they occurred, there was always an air of expectation about every session to come. Once, a student brought along a petri dish showing a diagnostic method used to characterize the sensitivity of bacterial colonies to different antibiotics. On another occasion, a lot of time was spent figuring out why a young woman (the subject of the clinical problem in that learning unit) who had been immobilized for a long time had developed chest pain; it was truly a delight to observe the students arrive at a plausible hypothesis for this clinical presentation.

On another occasion, the students picked me up at the airport as I arrived home after my vacation; their plan was to have dinner and then hold the tutorial that night (it was scheduled for the next

morning). I readily agreed and time sped by so fast that, before I knew it, it was time for school the next morning. Those tutorial sessions were the highpoint of my professional career. At the end of one unit, the group commented that they had never enjoyed themselves so much, and that, in the process, had developed a sense of trust and respect for their colleagues and for me. To this day, all of us keep in touch and whenever I visit my school.

I make it a point to meet up with as many of the students as are still there; needless to say, an impromptu tutorial for old times' sake is part and parcel of our get-togethers.

Self-sufficiency, enjoyment of learning, and interaction with peers are key ingredients in the formation of a well-rounded person. The realization that learning is a life-long process is also very important.

In medical schools where anatomy, biochemistry, and physiology are taught in isolation from pathology, microbiology, pharmacology, medicine, and surgery, students cannot appreciate the interdependence of these disciplines nor the relationship between the normal and abnormal.

The ability of an undergraduate student to learn by himself is often underestimated by faculty.

Young minds are like sponges looking for and absorbing new bits of information, sifting out the unnecessary from the relevant in the process. Student-centred contextual learning is key to a holistic education and to the formation of a total personality. This has now become all the more important in the context of the times in which we exist—we are in an uncertain and unpredictable age, fraught by dwindling natural resources, drastic environmental hazards, global warming and its dire consequences, and threatening social, political, and economic climes. It is imperative that the citizen of today be equipped with the necessary skills to combat these problems. We must learn to be compassionate to fellow beings, to engage and inspire communities, and to be aware of our own and another's potential. The process of adaptation needs to begin at an early age: in primary schools so that by the time our children reach an

advanced school/college environment, they are already aware of and capable of using their self-learnt abilities in the building of a cooperative effort to forge a livable and better world.

Fifty years ago, what Postman & Weingartner (1969) wrote in *Teaching as Subversive Activity* becomes all the more relevant and necessary to cope with a time of technological advancement but moral decline.

References

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

13. A Love Story of Twenty Years with Problem-Based Learning

Josep-E Baños

I will be honest—the first time I heard of problem-based learning (PBL) was in 1993 when I was writing my teaching report as a part of my tenure exercises as an associate professor at the Universitat Autònoma de Barcelona (UAB). I had never had training in teaching or pedagogy at the college level. Therefore, I was surprised to read about a method where a group of students worked together with a tutor to analyze cases, with the students generating their own questions and finding the answers by themselves. At the time, this seemed like an impossible way of teaching—a craziness of Anglo-Saxon countries that could never to be applied to my university, settled in a Latin country with very different teaching traditions.

To help you understand my feelings at that time, first let me introduce myself. I am an MD who completed a residence in clinical pharmacology and obtained a PhD in pharmacology. My focus was on the physiology of the skeletal neuromuscular junction. After my PhD, I took up a post as an assistant professor. I was trying for a tenured position when I read about the PBL stuff that started at McMaster University and was later adopted at Maastrich University. As I worked through my tenure application, I wondered how PBL actually worked, but I soon forgot about these ponderings after I received tenure. My interest was not renewed until a few years later.

In 1996, when I was President of the Catalonian Society of Pharmacology, a friend of mine at the Veterinary School of UAB asked me if a visiting professor from McMaster University could be invited by the Society to give a lecture on the way PBL changed his university. I was intrigued because I remembered my readings

on the method, and I quickly accepted the proposal. The professor was Edwin E. Daniel. I chaired the session and was very impressed by his account of how everything started in McMaster's Honours Biology and Pharmacology Programme. In the dinner that followed, I asked Edwin more about the implementation of PBL and explained my prior interest in the method. Unexpectedly, he invited me to Hamilton to see for myself how everything worked. He also told me about a course that was scheduled for the following November for foreign professors that centred around the PBL teaching method. The invitation was one that I could not resist: to receive formal training and to see the PBL method in action. I am still in debt to Edwin for his invitation, which changed my way of teaching in the years that followed. So, I got myself organized and packed my things. At McMaster, I made friends that I still have today. First, Patangi Ranchagari (Chari), who has had great influence on me since then. Second, the director of the course, Luis Branda, who I later met in Barcelona and with whom I edited a book on PBL in health sciences [1]. Unfortunately, he passed away two years ago.

Let's follow my journey with PBL step-by-step.

I came to McMaster in the autumn of 1996. In addition to any exposure I might have during the course for foreign professors, I asked if I could attend some PBL tutorials during my stay, so Edwin introduced me to some of the PBL tutors at the university. I attended lectures led by Luis, as well as tutorials led by other members of faculty. I still remember the first tutorial with Denis J. Crankshaw, which I attended as a guest. The problem that the students were tackling was about an obese guy working in the field of eating disorders. The students, who were in their first year of the Honours Biology and Pharmacology Programme and were in their second tutorial session, had already gathered information about the case. In this session, the students talked about how eating is controlled using papers published in Science. I was in shock. What? First year pharmacology students were reading (and understanding) articles in first-line journals and were able to discuss them? I wondered if I was experiencing the effects of some unexpected

psychedelic drugs. In my lectures and seminars, students were completely passive—they never read papers from journals, at least not as undergraduates. How was all of this possible?

My shock continued into the next day when I assisted in a tutorial of first year medical students. I was waiting at the door of the classroom when the tutor appeared with a coffee mug and a doughnut in his hands. I introduced myself and entered the room. A group of students were there, ready to begin. The tutor gave me a piece of paper upon which the problem was written. It was centred on a girl with diabetes who was in a ketoacidosis-induced coma; her diabetes had been overlooked until then. Students started to analyze the case, considering the physiology of carbohydrate regulation, the role of insulin, the pathophysiology of diabetes, the effect of diabetes on fatty acid metabolism, metabolic acidosis, and the resulting hyperventilation. I was completely astounded and unable to come to terms with what I was observing. While the students explained their findings and their reasoning, the tutor drank his coffee and ate his doughnut. What kind of teaching was this, I thought, with the students doing all the talking and the teacher only observing and not saying anything? To be fair, the students did occasionally ask for the tutor's approval of their reasoning, to which the tutor would respond by moving his head.

My third episode of shock occurred when I attended Chari's tutorial. Given my background in pharmacology, I was interested when he explained that the problem in question was a case about drug metabolism—I wondered how PBL could be used to teach pharmacology. The students analyzed a case where a fluoroquinolone antibiotic was causing sleep problems in a man who drank several cups of coffee each day. When the antibiotic was changed to another of the same family, his sleep problems disappeared. I was surprised to see how well the students coped with the complex problem and how they were able to arrive at an understanding of the reason for the man's problem. Better still, the students were able to use their new knowledge to understand how

differences in drug metabolism can explain some unexpected drug effects. Impressive.

My final experience with PBL occurred during a visit to Harvard Medical School while I was still at McMaster. Harvard had started the New Path, which introduced PBL in the preclinical years of medical training. I had read a book by the Dean at the time, Daniel C. Tosteson, about Harvard's experience with the New Path, which prompted me to ask him if I could pay a visit to see how it worked. When I arrived, Dr. Miriam Wetzel from the Office of Educational Development cordially received me and explained the program. She even invited me to an evening dinner during which professors from the School of Medicine prepared PBL activities for the following months. I still remember the discussion about the new problems, as well as the PBL exercise that the tutors themselves undertook that addressed some of the common problems that PBL tutors encounter with their students. This was a new, inspiring experience for a naïve teacher—I was most definitively in love with PBL. I often liken my transformation to the conversion of Saint Paul to the Christian religion. Saint Paul was a strong persecutor of Christians until, when on his way to Damascus, he heard the voice of God who told him, "Paulus, Paulus, why are you persecuting me?" When Saint Paul heard this voice, he fell to the ground, and from then on, he was a pious follower of the Christian God. I felt in the same way. I was completely taken by PBL. For now.

After two weeks at McMaster, I returned to Barcelona. On the return flight, I thought about how I could apply PBL to my teaching. I was certain that changing the curricula of UAB to PBL would be impossible. What, then, could be done? Several weeks later, I had the opportunity to give a seminar to my colleagues on my experiences in Hamilton and Boston. The seminar was a failure. My colleagues looked at me as though I was a crazy or, even worse, that I was foolish. Nobody seemed interested in the method, with the exception of a few friends in my department. I was not sure if their support was about friendship or a genuine interest in PBL. I

had planned to start a sabbatical year, so I forgot about PBL for a while.

In August 1997, I began a sabbatical year at the Allegheny University of Health Sciences (now Drexel University) in Philadelphia. My goal was to learn about experimental models of neuropathic pain in the lab of Dr. Gary Bennett, who had recently moved from Bethesda. As a visiting scientist, one typically has plenty of time to work in the lab, to read, to write—and most importantly, to think. At that time, PBL came to my mind and I asked myself again how I could use it in my teaching. It was then that I had an idea that changed everything for me. Why not use PBL as a teaching method, rather than changing the whole curriculum of my university? The idea was mature when I returned to Barcelona in September 2018.

I suggested to my colleagues that they use PBL as a teaching method in Pharmacology courses that had a practical nature. This suggestion received positive attention because medical students generally dislike lab activities involving rats, and by that time, the use of animals was very restricted. PBL—although modified from the 'pure' model of McMaster—offered an excellent alternative approach to practical training. Although we did not use PBL as the primary model for disseminating knowledge in our courses, we did adopt a hybrid model in which lectures remained and PBL tutorials were used to discuss and deepen the students' knowledge through critical analysis, the search for information, and summary discussions. Towards this aim, we chose topics that were difficult to understand in lectures, such as the pharmacology of cholinergic and adrenergic drugs or the mechanisms of non-steroidal anti-inflammatory agents. The tutorials were organized as three-hour seminars, during which the group would read and discuss a problem, identify relevant questions and gaps in knowledge, and would then go to the library to find answers. The session finished when students reported their findings, shared with the other members of the group, and, finally, discussed as a group the answers to the questions that they had initially proposed. The tutor acted as a facilitator of the process, asking the right questions to test the

knowledge of the students, but outside of the traditional role of teacher. These tutorial experiences were very successful. In the end, the students were so pleased with the process that they requested an increase in the time devoted to these types of tutorials and a decrease in the number of lectures. We published two papers describing our approach [2]; the results of a survey of student satisfaction [3] was published at the same time.

In 2002, I moved to the Universitat Pompeu Fabra (UPF), taking on the role of professor in the new Bachelor of Biology Program that had started four years prior. My main task was to contribute to organizing the professional tracks in the fifth year of the program. The goal was to provide an opportunity for students to gain some professional experience before graduation [4]. PBL was integrated into the new curriculum alongside lectures, seminars, and internships in research units, clinical laboratories, or at pharmaceutical companies. Students welcomed PBL tutorials, which they scored the highest in terms of their value relative to other teaching activities [5]. By 2006, we had started a Master's program that also incorporated PBL activities, as well as lectures, seminars, and internships at pharmaceutical companies. We are still following this approach thirteen years later.

In 2004, Catalonian universities started on a path towards the European Higher Education Area (EHEA), an agreement of European Governments to converge to a common university system to improve the competitiveness of European universities in a global environment. To this end, UPF started pilot studies in which we adopted new teaching paradigms. Our strategy was to introduce PBL as a teaching method in each subject, and to write problems that shared educative objectives with several of them, while also maintaining traditional teaching activities. Some of the time that was historically devoted to traditional teaching activities shifted to PBL activities. This new approach required the participation of many teachers from different disciplines, all of whom required training in the PBL teaching method. During training, potential tutors learned about PBL, they wrote problems together, and they

agreed upon evaluation methods. In the end, a huge number of tutors were trained, allowing PBL to successfully integrate into the overall teaching strategy of the school. The pilot project ended in 2012, and the new curricula—which followed EHEA guidelines—were implemented at UPF.

The implementation of the EHEA curricula began in 2008. Our experience in the pilot studies taught us several lessons. First, teachers were reluctant to reduce their traditional curriculum content to allow integration with other disciplines. Second, the students were not happy with the evaluation criteria, which, in their opinion, did not fairly align with the effort and time that they devoted to PBL activities. However, several studies showed that PBL activities, even when used as part of a hybrid approach, enhanced the long-term knowledge of the students [6,7]. Students and teachers agreed that PBL activities improved the knowledge and development of soft skills [8]. We concluded that the hybrid approach was a success, but we needed a new strategy that permitted full acceptance by teachers and students. This led to the development of subjects that used PBL to integrate knowledge across disciplines. We called these subjects 'Integrated Medicine' and 'Integrated Biomedicine' in our Bachelors of Medicine and Human Biology programs, respectively.

These new subjects were designed to allow the use of the PBL approach in the first three (Human biology) or four (Medicine) years of the curricula. Their content was interdisciplinary and included knowledge from all disciplines. The courses were delivered exclusively by PBL, and cases were built with common educative objectives and were written by tutors using a consensus approach. In the case of medical students, basic and clinical content was included in every problem, starting in the first year of the curriculum. This new era started in 2008. A survey carried out six years later (the year that the first cohort of medical students graduated) showed that students considered these activities of high value, helping them to enhance their understanding during clinical training [9].

What have I learned after all these years? First, the implementation of PBL is not easy and teachers are reluctant to accept this approach, especially in universities that have a long history of using traditional teaching approaches. Second, a concerted and significant effort is needed to train teachers in the PBL. Third, when a full curriculum in PBL is not feasible, a hybrid approach is a good alternative. Fourth, students express a high satisfaction after being trained using PBL, and they feel that this approach helps them acquire soft skills and improve their ability to understand complex issues. For all of these reasons, I believe that PBL is one of the best methods to learn how to learn. This is the main reason why I am still in love with PBL, twenty years later.

References

[1] Carrió M, Branda L, Baños JE (dir.). El aprendizaje basado en problemas en sus textos. Ejemplos de su empleo en biomedicina. Barcelona: Fundació Dr. Antoni Esteve, 2013.

[2] Baños JE. (2001). El aprendizaje basado en problemas en los planes de estudio tradicionales: ¿una alternativa posible? *Educ Med* 4: 4–12.

[3] Vivas NM, Badia A, Vila E, Baños JE. (2001). El aprendizaje basado en problemas como método docente en Farmacología: la opinión de los estudiantes de Medicina. *Educ Med* 4: 194–201.

[4] Aramburu J, Bosch F, Sentí M, Baños JE. (2006). Los itinerarios profesionales en Biología: un ejemplo de formación académica orientada a la inserción profesional. *Educ Med* 9: 23–30.

[5] Bosch F, Baños JE. (2010). Tendiendo puentes: la utilidad de la historia de la ciencia para comprender el proceso de investigación y desarrollo de medicamentos. Educ Med 13: 255–62.

[6] Carrió M, Larramona P, Baños JE, Pérez J. (2011). The effectiveness of hybrid problem-based learning approach in the teaching of biology: a comparison with lecture-based learning. *J Biol Educ* i: 1–7

[7] Carrió M, Agell L, Baños JE, Moyano E, Larramona P, Pérez J. (2016). Benefits of using a hybrid problem-based learning

curriculum to improve long term learning acquisition in undergraduate biology education. FEMS Microbiol Letters 6363: 1-7.

[8] Carrió M, Larramona P, Pérez J, Baños JE. (2018). Percepciones de estudiantes y docentes sobre la implementación del aprendizaje basado en problemas como método docente. FEM 21: 143–152.

[9] Sentí M, Bigorra J, Samsó E, Minguella J, Miralles R, Girvent M, Solsona JF, Baños JE. (2015). A collaborative project to bridging the gap between basic and clinical sciences: The opinion of medical students. *J Biomed Educ* vol. 2015, Article ID 620348.

14. My Undergraduate Journey … Upon Reflection

Felicia Vulcu

The concept of student-centred learning is not a new one. I first read about it from a paper written in 1987 entitled "Seven Principles for Good Practice in Undergraduate Education" (Chickering & Gamson, 1987). To this day, I remember reflecting on the content of this paper and trying to fit my undergraduate education to these principles. Experiences that truly engaged me as an undergraduate student took place in small spurts spread across a few courses. The common threads between these experiences included team learning, an interaction with the instructor, and a truly awesome problem we had to tackle. I didn't know it at the time, but I was experiencing problem-based learning in its true form: engaging students with each other, the course facilitators, and content.

What I realized later in my life is that these wonderful student-centered learning experiences were much more than just the content presented: the environment I was in added more to my engagement in this process than any content matter ever could. I was so fortunate in my undergraduate degree to be constantly surrounded by a group of truly amazing peers. We took the same courses, we studied together, we learned from one another, and we supported one another—and together we invited student-centered learning whenever it was offered. Keep in mind, this was the late nineties and many courses were still taught in the traditional style of passive lectures, midterms, and finals.

But once in a while we encountered moments of learning perfection. These moments came from course instructors who sought to infuse student engagement in their teaching styles: from relating fundamental knowledge to real-life cases, to introducing ethical and social debates to scientific content. What made these

moments truly perfect was the environment itself. I know, it sounds odd at first, but the environment trumped content. In these perfect student-centered moments, I felt safe, respected, and appreciated. Everyone in the room shared their opinions, and everyone's viewpoint mattered. We were all equal in every way.

My hope is that everyone who reads this has an idea of what I am referring to. The perfect moment: when time almost stops, and the environment is charged with happiness, optimism, and excitement. All individuals in this environment collaborate together, all stigma is forgotten, and the only thing that matters is the task we have been challenged to undertake.

One of these perfect moments revolved around the topic of amino acid structures. That's right, something most people think of as a fairly dry topic. I still remember it like it was yesterday: an entire group of second year biochem undergraduate students crowded around a wooden table in one of the Mills library group study rooms. We all stared at the assignment with awe and wonder. None of us knew how to tackle it, so we spent a good 20–30 minutes staring at it with nothing to offer. Then slowly, a few of us brave people started to talk. What did we say? Well, the truth really. We voiced what everyone thought, "I have no idea how to tackle this problem and I am absolutely terrified." From there it was like something broke and everyone felt relief that we were all in this together, and no one was stupid or incompetent. We tackled the problem once again, we chunked it out into workable pieces that we could easily digest, we divided the work, and we came together as one team with plausible solutions to the assigned problem. It was such a wonderful moment—a bonding event that allowed us to experience not only content skills, but also transferable skills like teamwork, optimism, resilience, and hope. We created a milieu filled with kindness, compassion, nurturing, and happiness.

As a result, I stand here, many years later, a teaching professor at McMaster University with only one mission: to create learning environments conducive to student-centred learning. Every day, I strive to ensure that my students feel safe, happy, and optimistic.

Every day, I listen and share, and through this process learning occurs. The content I teach is biochemistry, biotechnology, and drug discovery, but these are just scientific concepts. At the core of my teaching philosophy is the pursuit of these perfect learning moments, driven by student engagement, where all societal barriers are removed and all that is left is learning.

References

Chickering, A. W. & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin* 3: 7.

15. Reflecting on the Metaphor and Practice of Reflection in Education

Stacey A. Ritz

Human beings tend to think in metaphors and analogies a lot—probably because they provide a convenient and satisfying cognitive strategy for understanding novel situations using things we have already experienced as an anchor point, allowing us to transfer our insights and knowledge from one context to another. As such, the use of metaphors can be an exceedingly useful way of communicating complex ideas and relationships between people, and they can form powerful images in our minds that can stimulate new ideas and ways of thinking.

At the same time, however, we should be cautious about our use of metaphors. Considered from the perspective of discourse analysis, metaphors operate "by applying one taken-for-granted field of knowledge and applying it to another" (Chilton & Schaffner, 2011, p.320). In order for the metaphor to be legible, those on the receiving end must know and share certain values, experiences, and referents, and they must affirm certain perspectives and values that align with it through the similarities that are highlighted, while obscuring or ignoring other elements that don't necessarily fit with the imagery evoked. For example, in immunology it is common to use militaristic imagery and metaphors to explain immune function, with white blood cells likened to soldiers, antibodies to weapons, and microorganisms to enemies. This metaphor can certainly be quite useful in trying to understand certain aspects of immune function, particularly when it comes to host defense; however, if we buy in to the metaphor too completely, it can be a significant misrepresentation of how things actually work (which becomes

especially clear when you start to think about all of the ways that we live in harmonious symbiosis with microorganisms). Fairclough (1993) points out that in every instance where we use a metaphor we can ask: why have we chosen *this* metaphor instead of another? What linkages are being made? What are we emphasizing and what are we obscuring by using this metaphor? And what is the effect of using this metaphor on my thought and my practice?

In university education, the practice of 'reflection' has become increasingly prevalent, particularly in the health professions where the concept of 'reflective practice' has grown to become common in many health professional curricula (Mann *et al.*, 2007; Schon 1983). In these contexts, it's often not recognized that the term 'reflection' is, in fact, a metaphor, likening the practices of introspection and considering one's actions carefully to our common everyday experience of literally seeing ourselves reflected back to us by shiny surfaces like mirrors, water, windows, screens, etc. If we recognize that 'reflection' is a metaphor in this way, what are the implications for putting reflection in our curricula? What can we learn from subjecting the metaphor of reflection to some analysis and critique in order to better understand the hidden curriculum of reflection in higher education?

Reflection is a particularly visual metaphor that references our common everyday experiences of seeing images of ourselves being, literally, reflected back to us by a shiny surface. Our commonsense interpretation of these is that reflection permits us to see ourselves 'as we really are', but the idea that literal reflections give us unmediated, unadulterated views of reality breaks down very quickly once we think more deeply about the range of our actual experiences with reflection. In a 'perfect' mirror—one that is absolutely flat and without flaws or irregularities of any kind—we might expect to see ourselves 'as we really are'; at the same time, we know that such a perfect surface does not exist. Most mirrors are slightly flawed in one way or another, and funhouse mirrors deliberately create undulating shapes to transform our reflections in dramatic ways. The reflections we see on water can be

fragmented and deformed depending on the motion of the water. Those we see in windows or screens may be transparent and ghostly, making some features more obvious than others. The light used also influences the character of reflection. Even the most perfect reflective surface does not create a reflection in the absence of light. When we think about the reflections created on windows, much depends on whether the light source is on the same side of the surface as we are. And, of course, a lot depends on where exactly we are located with respect to the surface and the light. We can make use of these properties of the physical production of reflections to visualize things that would be otherwise invisible to us, for example with reflective telescopes and three-way mirrors. Recognizing that 'reflection' is a metaphor can help us to think more deeply and critically about what we mean by introspective reflection and what we hope to achieve by using it in education.

First, the way we judge and value what we find during introspective reflection is coloured by experience, social norms, and ideology. There was a full-length mirror at my mother-in-law's house that I loved because it made me look thinner than I really am, but the curve of the mirror producing that effect was so slight that the image didn't appear to be obviously distorted. It was a strange moment of cognitive dissonance for me because I know full well that my body doesn't quite look like that, but the image doesn't give any obvious signs that it is distorted. The fact that I experienced seeing a reflection of myself as thinner than I really am as a positive, desirable thing is germane here. In a different social context, being thinner may have no emotional or value-laden content, or I might experience it as a negative thing to be thinner. In my culture, however, my emotional response to the reflection is heavily influenced by the fact that current social norms have idealized certain body types for women. Other culturally- and socially-produced experiences will also influence our reflective practice—a person who has developed an awareness of their social privilege will probably generate very different kinds of reflections on and interpretations of their own actions than will someone who

denies or is unaware of their privilege. Thus, the kinds of reflections produced by deliberate introspection will depend largely on the qualities of our 'internal' cognitive reflective surfaces—what we value, prioritize, are interested in, have experienced previously, or recognize as relevant.

Second, the metaphor of reflection directs our attention to the fact that we will only see that which we have shone a light on. People are often loathe to 'shine lights' into the dark corners of their psyches, and they fail to contemplate or even acknowledge the existence of parts of themselves they find most challenging—often the things they would benefit most from reflecting on. Thus, one's reflective practice is only as good as one's willingness to confront and contend with potentially objectionable truths about one's self.

Third, 'reflection' reminds us that when we hold our tools in the right way, at the right angle, and with the right lighting, we are able to see things that we wouldn't otherwise be able to see and enhance or even transform our self-images. I'm reminded of the way that some second-wave feminists encouraged women to use a mirror to inspect their vulvas as a way of demystifying a part of their bodies many women had never seen before, pushing back against the culturally inculcated sense of shame associated with women's genitalia. However, this moment of transformation is only possible if the configuration of the elements is right—if not, we may not see anything even if all of the components are there.

In considering reflection in the context of education, I'm particularly concerned about how the hidden curriculum of assessment will influence how reflection is undertaken by students, its contents, and how it is valued. When reflections are mandated in response to specific prompts, this will have significant implications for the content, form, and structure of the reflection produced, constraining the reflection to that domain which the authority figure has prescribed. When such reflections are to be evaluated, a set of power dynamics are created in which students are more likely to express views they believe to coincide with the expectations of the evaluator—a quasi-capitalist exchange in which students are

'paid' in marks for delivering the 'right' answers. When their reflections are mandated by an authority figure and subject to evaluation, we must be alert to the likelihood that what they provide is more a representation of what they perceive as being acceptable to express and conforming with what they understand the expectations of that authority figure to be than it is an authentic representation of themselves. As Bleakley puts it, reflection in this context functions as a "paradoxical discipline, a technology of the self in which…there are certain things that may be said and those that may not be said" (2000, p.14). Given the power relations here, there will be considerable incentives for students to reproduce the content and values they understand to be expected of them.

This is a particularly challenging nexus for educators who see value in reflection and in cultivating the capacity for authentic, critical introspection in students. When we require reflection as part of our curricula, and particularly when we evaluate it, it becomes difficult to know whether a student is authentically engaged with the process or simply constructing a simulacrum of genuine reflection to satisfy our requirements. Ultimately, though, perhaps it's a moot point—if a student knows enough to be able to produce a 'fake' reflection, then at least they have gone through a process of considering carefully what such a reflection 'ought' to look like, which is probably of value in and of itself.

References

Bleakley, A. (2000). Writing with invisible ink: Narrative, confessionalism, and reflective practice. *Reflective Practice* 1: 11–24.

Chilton, P., & Schaffner, C. (2011). Discourse and politics. In: T.A. van Dijk (Ed.) *Discourse Studies: A Multidisciplinary Introduction* (p. 303-330). London, UK: Sage.

Fairclough, N. (1993). *Discourse and Social Change* (1st edition). Cambridge: Polity.

Mann, K., Gordon, J., & MacLeod, A. (2007). Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education* 14: 595–621.

Schon, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York, NY: Basic Books.

16. Circular Pedagogy: Teaching and Learning as Improvisational Performance

Sean Park

As an antidote to education as a dead, scripted performance, I put forth teaching and learning as a circular and improvisational performance. In improvised performance arts such as improv theatre or jazz, practitioners learn presence, spontaneity, resourcefulness, empathy, irreverence, critical thinking, and how to create within a framework of advancing the action of performance. Likewise, creative teaching aims to transform both the educator and the student, which may involve new framings of issues, new questions and possibilities, plans for action, and radically reperceiving self and other. Creative teaching that can hold the paradox of planned and unplanned learning directly addresses the late Canadian curriculum theorist Ted Aoki's (2000) question: "Where is living pedagogy located?" Aoki urged us to engage in pedagogy as improvised conversations that educators and learners have "in the midst of the plannable and the unplannable, between the predictable and the unpredictable, between the prescriptible and the nonprescriptible … between the curriculum-as-plan and the live(d) curricula" (p. 2).

The implications for improvisation and creativity in teaching are significant because contemporary education, unfortunately, is heavily dominated by an emphasis on individual intellectual achievement, testing and grades, and preparation for livelihoods in a materially-oriented society. Educators, learners, and wider society work in an instrumentalist paradigm that views human beings as knowledge producers (Willinsky, 2005; Robinson, 2001). Aoki (2005/1990) warned us that we are "in the seductive hold of a technological

ethos, an ethos that uncannily turns everything virtually into 'how to do's,' into techniques and skills." (p. 369). An instrumentalist and scripted education is dangerous in that it chips away at both the passion and love educators have for teaching as an art, and it robs learners of the opportunities to engage in curriculum as a life-affirming and community-building endeavour.

I put forth here some preliminary ideas about teaching and learning as improvisational performance in terms of a cybernetic conversation that pays attention to how one pays attention. These ideas embrace paradox and circularity as foundational to how the lived realities of educational encounters unfold. I draw from the work of Bradford and Hillary Keeney—family therapists, cybernetic theorists, and artists—to lay down some solid cornerstones for thinking clearly about teaching and learning. Building upon this foundation, I present some of Keeney's ideas on paying attention to 'resources' as a means of moving a conversation from a problematic or vicious state of affairs towards ones that are more generative and virtuous.

Utilizing whatever is offered as an invitation into improvisation, I suggest that the educator be prepared to enter all encounters empty-handed and without a preferred theory for how interactions with students will unfold. Instead, the educator pays attention to and inquires about *whatever* may lead to territory that is different enough to make a difference. I share a case transcript of a conversation between a group of students, and I reflect back upon Aoki's question in the context of how improvisational interactions may feed virtuous circles and nurture wholeness.

Cybernetic circularities

Cybernetic epistemologist Bradford Keeney suggests that "to understand any realm of phenomena, we should begin by noting how it was constructed, that is, what distinctions underlie its creation" (Keeney, 2002, pg. 21). At the very outset of any work, one's "epistemological slip" (pg. 22) is showing. How one first draws the line and subsequently draws it over and over, in effect, creates the room that hosts the conversation. As mathematician G. Spencer-

Brown in his *Laws of Form* (1969) put it, "a universe cannot be distinguished from how it is acted upon" (pg. v). Spencer-Brown's statement referred to "how a universe—whether linguistic, mathematical, physical, or biological—comes into being the moment a distinction is made, that is, any attempt to distinguish or separate whatever is regarded, proposed, defined, perceived, found, decided, allowed, or intended as different" (Keeney, Keeney & Chenail, 2015, pg. 5). Distinctions are anything that generate a meaningful difference from the undifferentiated. What we pay attention to through our gaze and our naming of things is the manner in which we cut up the world into a this and that.

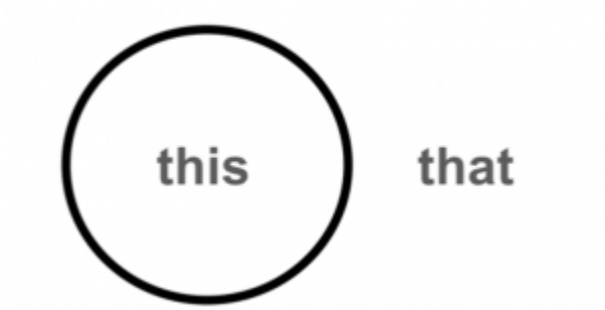

Figure 1. This/That

The act of distinguishing what our primary aim is as educators—our primary distinction—differentiates who we are and who are not, what is and what is not considered a part of the curriculum, and so on. Where and how we draw the lines tells us just as much about who we are as it does about what is considered an education or a classroom. Our distinctions matter because "a distinction that is re-distinguished becomes more distinguished than before; each subsequent re-distinguishing contributes to it becoming more 'real' until it becomes experientially realized as 'thing-like,' reified as more than a conceptual abstraction" (Keeney,

Keeney & Chenail, 2015, pg. 6). Another mathematician, Heinz von Foerster, conveyed Spencer-Brown's axiom in a different way when he said that objects (including objects of awareness) don't speak for themselves; it is us that generates the descriptions and we must thus include ourselves and our means of generating descriptions (von Foerster, 1984). This circularity of subject-object co-creation is reflected in architecture with Winston Churchill's famous aphorism "we shape our buildings; thereafter they shape us".

A situation in which a student is not speaking up in class, depending on how the line is drawn, might be a 'problem', 'a resistant student', 'someone who is listening deeply', 'excluded because of oppressive forces', or 'an indication that permission to speak has not been granted'. Re-distinguishing the behaviour over and over, using such language and pointing, establishes a *frame* that now organizes how the phenomenon is perceived and what constitutes binaries of choice. Problems require solutions, resistance requires the application or removal of force, listening deeply is differentiated from surface listening, oppression requires emancipation, and so on. A distinction is simply where a "line" is drawn to distinguish a this from a that. It is in the act of generating a difference between this/that that information is created. The subsequent act of reinforcing a distinction constructs a frame. A frame is simply the result of making a distinction over and over again such that it organizes the relationships between everything inside it.

Teacher-learner relationships can be distinguished and subsequently framed as a dance, a battle, or a work of art amongst countless other metaphors. Dance, for example, provides us the structure of a whole lifeworld—leading and following, posture, space, movement, breath, formal styles, basic moves, improvisation, emotional expression, and the joint aim of beauty, grace, authenticity, spirit. To be open to marking the acts we engage in as teachers and learners as a dance—or some other rich, creative metaphor—enables us to make moves and gestures that approach

the performance with an aesthetic appreciation for that which has vitality and life.

Orienting with an epistemological perspective that embraces the paradox of the thing and the process that leads to thing as indistinguishable enables a presence and view within conversations as a circular and recursive universe (Keeney, 2002; Varela, 1976). Consider the following example. I was on a boat trip just off of Cape Cod in the US Atlantic a few years ago. Speaking with the boat's pilot, I learned that, to navigate the channels from the port out to the sea, he had to pay close attention to where the buoys had been placed and what was showing up on the radar in real-time. Because the tides and storms radically shift the sand under the water each year, maps from previous years are not very reliable. Successful navigation—getting to the destination without crashing—was a process of mapping that involved the continual generation of and discarding of provisional maps in real-time. The pilot had to take up the cybernetic invitations to "act in order to know," to sense in real-time and generate meaningful distinctions or "differences that make a difference" (Bateson, 2000).

This relationship between map and territory is circular and recursive to the extent that distinctions (e.g., where the way is clear and where it is blocked) arising from acting upon the territory with our senses and instruments, generates perspectives that inform the next actions. This simple feedback loop is understood as a form of first-order cybernetics whereby:

> "Feedback is a method of controlling a system by reinserting into it the results of its past performance. If these results are merely used as numerical data for the criticism of the system and its regulation, we have the simple feedback of the control engineers" (Wiener, 1989, p. 71).

Visually, we can represent this circularity as set frame reversals of part/whole relationships.

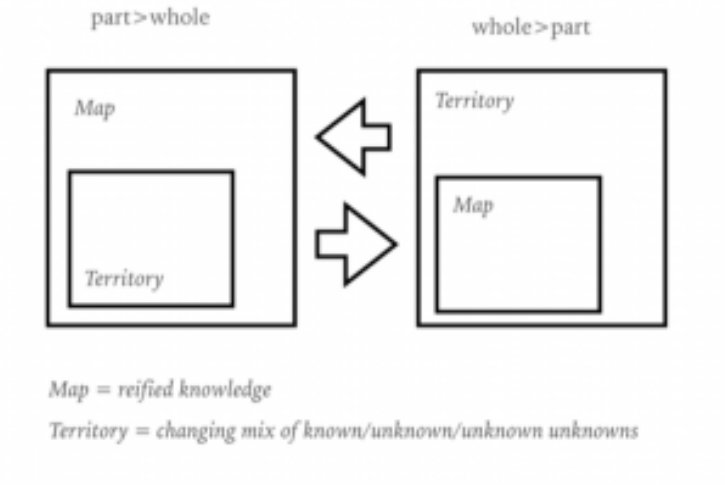

Figure 2. Part and Whole

The boater moved from left to right because the complex and changing territory could not be viewed through the perspective of the old map. As easy and convenient it would be to impose yesterday's map onto today, it would put him and his boat in peril. The flip to making the map a part of, but less important than paying attention to, the territory (it may still provide some overall perspective) makes the changing whole more significant than the part. In an instant, through mapping as continual process, a provisional new map is created to inform the next movement about how to move in the territory. There is another way of looking at the circularity that involves a second-order change, whereby "if … the information which proceeds backward from the performance is able to change the general method and pattern of performance, we have a process which may be called learning" (Wiener, 1989, p. 71).

For the boater, the information generated from sensing the shift and shape of the ocean floor could simply be used to regulate how

he reaches his destination, or it may be used to change the boater himself. Speculatively, the boater could:

- Learn that he is too stressed out by having to continually pay attention to the radar, give up using a motorboat altogether, and switch to kayaking;
- Assemble information about the tides, currents, weather, and climate over long periods of time into patterns that might suggest what a given season of boating might be like, and thus inform him of when boating might be favourable;
- See the impact of extreme weather and rising sea levels on the local environment, learn about the impact of motorized vehicles on the climate and aquatic life, decide that boating is not good for the environment, and give up boating.

These changes are changes in the premises or frames that organize how a person acts. The "goal" of the cybernetic feedback, what it appears to be orienting towards, has changed. And, thus, it is both a question of how educators and learners craft tools for living and maps of understanding from the territory of their lives towards certain desired ends, but also how such interactions can be organized by different premises that aim towards different ends. This is important because, unlike a boat ride which may have an agreeable and fixed destination, it is difficult to agree upon or know ahead of time what good outcomes to the complex social challenges we live with look like.

We return here to the paradox of being enmeshed in both map and territory, the thing and the process leading to the thing, the individual within a context, and so on. The problem with distinction of map and territory according to Gregory Bateson, one of the founding fathers of cybernetics, is that we get stuck in binary thinking. Paraphrasing Bateson, "neither map nor territory is to be preferred, but instead the difference between the two is utilized to inspire, irritate, transform and generate other differences" (Keeney, Keeney, Chenail, 2015, p. 11). It is not which maps and territories

should be used, but what to do when their circular relationships become habitually stuck in a repetitive loop by their premises, and because we are organized by these premises, we see no other way out.

On the left hand of the figure, we fit the data to the paradigm. The paradigm itself generates what the data is (and what is not data). The fixed map, a reduction, a part, is treated as being larger than the whole. Here, we know first and then we act. In the set on the right side of the figure, the reified knowledge that is the map is seen as a part of a larger changing whole. The territory is beyond understanding, it is the sum total complexity of which one is a part. Fixed models are provisional and one of other potential possibilities. Improvising, acting, sensing, connecting with the ever-changing territory generates new maps. One acts in order to know.

In the context of teaching and learning, we need the know how to help students and ourselves move from one side to the other and back again—reducing and increasing complexity, putting everyone into a paradoxical bind. The real conversation is in the movement, the flipping back and forth. Imagining the relationship between left and right as a wheel, how do we get the wheel turning in directions that are more virtuous and less vicious?

Vicious and virtuous circularities

The dilemma we face as educators is that we must respect a student's request for being educated as well as the ways in which this request is made, while simultaneously not feeding the vicious circularity exacerbated by reinforcing that we as educators have the answers to questions students bring (we do not). Educators and students alike would benefit from being freed of having to live in a problem-answer universe. A radically different universe would involve paying attention only to that which might serve whatever has some life and vitality for the student. To do so would be to enter into a generative, creative universe with students rather than suffocate and limit the range of options for action. Practitioners of change are encouraged to:

> "...feed the virtuous circle that is emerging while starving

> any vicious circles. Once you get a circle of virtuosity moving, it becomes effortless. It brings forth more expression and discourse that keeps its circularity moving. Notice that both vicious and virtuous circles work in the same way: they circulate whatever is fed into them. In this recirculation, an experiential reality is born and kept in existence" (Keeney & Keeney, 2013).

The Keeney's recommend "starving a vicious circle" by weakening the importance of problematic talk, noticing that even solution-oriented talk is just the flip-side of the same coin; they advocate that we pay attention to whatever is *resourceful*. They point out that "a resource differs from a solution in that it simply contributes something positive to a person's life. It is a *source* that feeds virtuous circles and beneficial change, however that is uniquely defined" (Keeney & Keeney, 2013, p. 41). A resource could be anything someone says, including "I liked the seafood more than the chicken" or "we learned from our interviews that it has to do with a sense of belonging". Discerning a resource and then feeding it is required to bring forth more resourceful expression. A preference for seafood might be sea-zed as an indication that one is no longer chicken and ready for a high sea adventure. One might inquire about the importance of a sense of belonging and ask if it is best smelled, touched, seen, heard, or tasted.

Any statement and one's response cannot be understood in isolation; instead it must be considered as part of an ongoing call and response that tacks in different directions. If, in response to being asked about being ready for a high sea adventure, someone questions what direction they are headed in, the conversation may turn towards what are considered worthy destinations. As the circle turns, conversations between teachers and students move forward without a strategy or set of best practices that direct the action. In the realm of improv theatre, the action can only proceed when participants take a 'yes, and…' approach in which no offer from any participant is blocked, and it must be built upon in some way that recursively moves the participants along in a story line built

in real-time (Johnstone, 1981). Creativity researcher Keith Sawyer (2004) regards such conversations as a collaborative, disciplined improvisation that, in an educational context, illuminate the emergent nature of teaching, learning, and curriculum engagement as creative art.

Not my problem

Five students in a course message me and ask for a meeting to talk about their project. Their project involves designing an intervention to increase a sense of belonging amongst undergraduate students. They have been asked to test out their ideas with others and use the feedback to gauge whether they are addressing something that is important to a particular group of people and if their intervention is helping to address the needs, hopes, dreams, and desires of the group.

Sean: Morning guys, how's it going with all this snow?

Student 3: Good.

Student 1: Pretty good, it was actually fun playing in the snow, yeah, we had a snowball fight last night at my house.

Student 2: Really?

Student 1: Yeah.

Sean: Awesome…so what kind of fun brings you guys in to want to meet?

Student 3: So, the feedback we got from people about our prototype wasn't great. We've been working on understanding what's involved in building community. We learned from our interviews that it has to do with a sense of belonging and that people wanted spaces for it. As you probably remember, we made a physical prototype of a community room—a diorama—that had various features designed to help people connect, like games. When we tested it with people, they pretty much said they wouldn't be that keen on using it. Something that really stuck out was when someone said, "something is missing". We don't know what to do.

Sean: Hmmm…What constitutes a sense of belonging? How is it generated?

Student 2: I think it has to do with knowing how your environment

helps you connect with people. Feeling like you can be you without judgement

Student 4: Yeah, like people can be themselves.

Student 5: …and also that people can talk, and that people will listen. People will understand where you're coming from. It feels good.

Sean: Ok, so let's look at one of these. Yeah, so people listening to you and hearing you out, seeing where you come from. Let me ask, do you guys think that this is something that is developed or that it's just random?

Student 4: I think people are shaped by their experiences, you know, life happens to happen. People don't really change so I don't think you can learn it.

Student 1: I disagree. I sometimes want to build on ideas with people, but I have so many in my head that I want to share. It's hard, but I'm trying to work on hearing people out instead of it being about my ideas all the time.

Sean: So, you [points to Student 4] think it can't and you [Student 1] think it can.

Student 4: Well…hmmm.

Sean: Let's dig a bit deeper here. What's actually happening in conversations where there is a sense of belonging. I mean, what are the actions and behaviours people are doing.

Student 2: There's listening.

Student 5: Appreciation for what people are contributing.

Sean: What do you mean?

Student 5: Like someone telling you that you did a good job, not just ignoring you behind their laptops.

Sean: What needs do you think people have around these things? Are they easy to do?

Student 3: No. Lots of people are shy. It's hard being honest with people. Vulnerability is an issue for sure.

Sean: So, I think we're getting really close to generating some really great ideas about what's next for your team, I can see it coming. It's kind of exciting.

Student 5: Sorry, where is this going?

Sean [to Student 5]: You look a little concerned. What's up?

Student 5: Well [laughing], I really need to know the outcome. I need to trust the process.

Sean: Great, let's add that last one to the list of things that's part of a sense of belonging [everyone laughing]. So, how are we with a sense of belonging right now? Are we listening, is there appreciation, is there trust of the process?

Student 1: I think so.

Student 5: Yeah.

[others nodding]

Sean: You had a wonderful metaphor with your first prototype, the physical space as an embodiment of something that supports a sense of belonging. What if space can be more than physical? Is there also not a space here with each other?

Student 1: Hunh.

Sean: The line that demarcates the inside and outside of the physical room you guys were working on doesn't seem that much different from the boundary we have here with the circle of us. Or the one we have in our classroom. It's also social, yeah?

[students nodding]

Student 2: So, our prototype doesn't have to be physical? It can be educational?

Sean: Why not?

Student 1: Hmmm.

[Student 5 looking perplexed]

Sean [to Student 5]: I have a special assignment for you if you're willing to accept it.

Student 5 [laughing]: What is it?

Sean: Your job now is to increase the ambiguity in the group and ask lots of questions that take the group off course. Mess with everyone [everyone laughing]. Relieve yourself of the burden to have to know where this is going.

Student 5 [smiling]: Ok, I think I can do that.

Sean [to Student 5]: Seriously, I think it will be fun. It's something the group needs, actually.

Sean [to others]: Who in here is really good with ambiguity, taking it easy and going with the flow?

Student 2: Uh, maybe him.

Student 1: Yeah, I love going with the flow. But so does he [pointing to Student 2].

Sean [to Student 1 and Student 2]: So, you guys like to take it easy?

[both nodding]

Sean: Ok, well I have a special assignment for you guys now. Should you be willing to accept it [everyone laughing]. Both of you now have the job of having to focus on the goal and worry about the outcome.

[laughter]

Student 1: Sure!

Student 2: Alright.

Sean: The group will be counting on you to do it. [Student 5] has done enough worrying, someone has to share the load.

Student 5: You wouldn't believe this [pulls pen out of bag]. I have a pen in my bag that says "Not my problem".

[everyone laughs]

Sean: Really?!

Student 5: Yeah.

Sean: Wow, that's amazing. How about that? But wait, I think we should also have something for these two fellas [grabs sharpie markers]. I'm going to give you guys these special pens as you will need them to help you stay focused on the outcome of all of this. You'll need to use it on tasks and some sticky notes for helping the group. These aren't just ordinary pens though [writes 'My Problem' on the pens]. It's now up to you to worry for the group.

[everyone laughs]

Student 1: Cool.

Student 2: I can do this.

Sean: Alright, you guys good? Sounds like you have stuff to work with.

Student 5: Yeah, not my problem guys!
[everyone laughs]

Figure 3. *Not my problem*

Lips on the trumpet

The above conversation that I had with students serves to help me reflect on the circularity of cybernetics, control in education contexts, and the place for the kind of improvisational, absurd play that might lead to using different instruments to inscribe upon ourselves distinctly different ways of being in the world. Ted Aoki tells a story of how he once asked a visiting jazz trumpeter—Bobby Shew—to come and talk to him and his students about education and curriculum (Aoki, 1990). He asked Shew two questions: when does an instrument cease to be an instrument, and what is improvisation? Aoki's invitation arose from his observation that in the field of curriculum, there is an obsession with goals, objectives,

achievement, and assessment. The obsession, he notes, is the hold of an instrumental and technological rationality that privileges understanding and control. Aoki recounts how Shew told a packed room how he introduced new students to trumpet playing:

"He told us how he would allow the student to hold the gleaming trumpet, not in front, but at his back, and to withhold him from bringing the trumpet to his lips. The first few lessons would be all lip and scat-singing work. And only when Bobby Shew felt that the trumpet in joining the lips would become a part of the body—become an embodied trumpet—would he allow trumpet and lips to meet. He insistently said, "The trumpet, music, and body must become as one in living wholeness" (pg. 368).

In response to Aoki's first question, Shew said that an instrument is no longer an instrument "when music to be lived calls for transformation of instrument and music into that which is bodily lived" (pg. 369). The curriculum is not something which one gains control of—it is something lived and felt by the learners in relationship to the ideas and 'instruments'. Curriculum is not just the content and strategies, but also the inner lives of the students and teachers and how they join together like lips on the trumpet. The whole student, like the educator, must become prepared, or 'tuned', just as any other instrument would before it is played. There is a gentleness and respect paid to the instrument, preparing ourselves to receive it by holding it 'behind our backs' until we are ready. Exercises in utilizing our own bodily instrument—our senses—calls us to see how our world is constructed through sensory participation, a foundation for new organs of perception and making a wider range of distinctions. The necessary absurdity of scat-singing, with its nonsense syllables and improvised melodies, is not a prescription for randomness; instead, it is a prescription for using our own instruments for knowing and expressing in melodic and rhythmic ways that are new, for keeping the circularities moving.

In response to Aoki's second question about improvisation, Shew speaks both of responding to other musicians but also "to whatever

calls upon them in that situation" (Aoki, 1990, pg. 368). The asking of the first question before this second one seems important. In order to live the music, the player must be played just as much as the instrument and the music. This co-responsive wholeness enables the musician to be called forth by the uniqueness of the situation rather than by a detached view that looks from the outside and imposes oneself upon the instrument.

The experience with the students was enlivening and exciting for me. They came in frustrated and left laughing with some new roles and an emerging sense of what their next steps should be. It seems that in stepping into a recursive universe with students, into wholeness and what was called for by the situation, that the felt, embodied sense of change was the most resonant feature of the experience. Indeed, the motion into life-generating, creative circularities that sustain paradox "often requires emotion so that change is actually felt…there is exhilaration, an excitement that signals that something is happening" (Keeney & Keeney, 2013, p. 45). The wisdom in Aoki and Shew's conversation on curriculum is that students and ourselves are best served by tuning ourselves to feel, notice, and sense what is resourceful. In so doing, we move from curriculum as something to be implemented to curriculum as something that is to be lived, something that may transform us and make us whole.

References

Aoki, T. (2000). Locating living pedagogy in teacher 'research': Five metonymic moments. In E. Hasebe-Ludt & W. Hurren (Eds.), *Curriculum intertext: Place/language/pedagogy* (pp. 1-9). New York, NY: Peter Lang.

Aoki, T. (1990/2005). *Sonare* and *videre*: A story, three echoes and a lingering note. In. W.F. Pinar & R. L. Irwin (Eds.), *Curriculum in a new key. The collected works of Ted. T. Aoki* (pp. 367–376). Mahwah, NJ: Erlbaum.

Bateson, G. (2000). *Steps to an ecology of mind.* Chicago, IL: University of Chicago Press.

Johnstone, K. (1981). *Impro: Improvisation and the theatre*. London, UK: Eyre Methuen.

Keeney, H. & Keeney, B. (2013). *Creative therapeutic technique: Skills for the art of bringing forth change*. Phoenix, AZ: Zeig, Tucker & Thiesen.

Keeney, H. Keeney, B. and Chenail, R. (2012). Recursive frame analysis: A practitioner's tool for mapping therapeutic conversation. *The Qualitative Report*, 17(5), 1-15.

Keeney, B. (2002). *Aesthetics of Change*. Guilford Press.

Robinson, K. (2001). *Out of our minds: Learning to be creative*. Oxford: Capstone Publishing Limited.

Sawyer, E. (2004). Creative teaching: Collaborative discussion as disciplined improvisation. *Educational Researcher*, 33(2), 12-20.

Spencer-Brown, G. (1969). *Laws of form*. London, England: Allen & Unwin.

Varela F. J. (1976) Not one, not two. *CoEvolution Quarterly*, 12, 62–67.

von Foerster, H. (1984). *Observing systems*. Salinas, CA: Intersystem Publications.

Wiener, N. (1989). *The human use of human beings*. London, England: Free Association Books.

Willinsky, J. (2005) Just say know? Schooling in the knowledge society. *Educational Theory*, 55(1), 97–111.

17. The Subversive Teacher: A Declining Species

Kulamakan (Mahan) Kulasegaram

The renowned sociologist Fred Hafferty conducts a workshop on the hidden curriculum entitled *Cats, Sheep, and Barnyard Animals*. The central activity is a poll of the participants: is your medical school training students to become the ultimate followers (Sheep) or the ultimate non-conformists (Cats)? This is a profound question for training in the health professions and indeed, any profession where both technical expertise and a larger commitment to societal responsibility are valued. At the heart of the question is a fundamental tension between conformity and disruption. While the question takes as its subject the students who are trained within the curricula, in the intellectual tradition embodied by the late Del Harnish, I argue that there is a more pressing question to be asked: are our teachers Sheep or Cats? Moreover, what implications does the answer have for how we train health professionals? My own answer is that our teachers (at least the truly exemplary ones) are Cats by disposition and discipline but are forced to act as Sheep in the service of increasing standardization.

When *Teaching as Subversive Activity* was published in 1969, the prevailing mood was disruption in the social and political landscape. Fittingly, the goal of the book was to outline a pedagogy that would empower and transform students with the ability to question, critique, and change society and educational practice. Despite half a century, health sciences and health professions education still struggles with how to train students who have an array of abilities to question and reform the institutions that train them. The 'forms' of education have been readily adopted, including inquiry learning, problem-based learning, and several other 'BLs'. Whether the resulting pedagogical processes and outcomes are actually

inculcating students with the capabilities advocated by Postman and others, however, is an open question. The enthusiasm for 'new' thinking and challenging received wisdom has not waned. Every so often, a laudable journal like BMJ or Academic Medicine will publish an editorial or commentary from medical pundits or thought leaders arguing that students must be prepared to challenge, critique, and provide new viewpoints to healthcare concerns. Doing so is not just good pedagogy—it is imperative if the future challenges of healthcare are to be met. Critical thinking (whatever that is), along with a whole host of allied ideas, are cited as essential components of a subversive and innovative cohort of students.

Our desire for subversive pedagogy must inevitably contend with an equally strong discourse: standardization of practice and outcomes. In health professions, clinical practice is subject to increasing standardization, and it is no surprise that health professions education has assimilated this discipline. There is nothing inherently wrong with standardization (a point acknowledged by Postman & Weingartner, 1969). Curricula are driven to standardization by a number of processes, including accreditation of professional programs, offices of faculty development that promulgate 'best practices', and a growing 'evidence' base that identifies 'efficacious' strategies for teaching. While these endeavours are well meaning in that they aim to create reproducible and reliable quality in education, they also have unintended consequences. Of relevance to us, standardization serves to stifle meaningful interactions between teachers and students. Increasingly, the vehicles—and I argue the victims—of the standardization of educational practices and metrics are teachers.

How do students learn to challenge received wisdom? From whom do they understand the skills required to question the system and their own assumptions? And significantly, from whom do they learn that there is *value* to this orientation towards learning and practice? Teachers. An effective teacher is not only the communicator of skills and knowledge but is also a role model for attitudes and values. While a teacher may actively work to

communicate skills and knowledge, their implicit and intuitive way of being can teach attitudes and values. The medium is the message, and the teacher is the text. This is a long recognized social fact in studies of the hidden curriculum. If teachers are part of a curriculum organized around questioning and critique—be it evidence, power, values—their actions, attitudes, values, and embodiment of teaching practice must so be aligned. Sometimes this may entail blatant contradiction of the formal curriculum and of the 'truths' that underlie health professions practice. The most memorable and impactful teachers are the most subversive. The iconoclasts, the curmudgeons, and the skeptics. We have all benefited from close interaction and inspiration from exemplary scientists. Common across all of them was an anarchic streak and a desire to question what they knew. Indeed, this was what made them successful scientists and subsequently role models for many of us as scholars.

In the past, teachers had the space to operate as dictated by their own expert judgements, disciplinary traditions, and (dare I say) personalities and quirks. For them, the classroom was a creative space to tell stories of science and scholarship. They made interesting and sometimes risky choices when teaching. As an example, my first statistics professor explained what a normal distribution was by using a graph of an international survey of penile length. This was a slightly shocking and perhaps juvenile way of presenting an important concept, but it communicated important ideas beyond the meaningfulness of the concept of a 'distribution.' It subverted our prior notions of how statistics are used and the nature of learning statistics, and it engaged us in a playful attitude towards what could have been a dry and difficult subject. And frankly, it was entertaining. As Marshall McLuhan said, "Anyone who tries to make a distinction between education and entertainment doesn't know the first thing about either." I was fortunate that the intellectual climate of education permitted a wide range of frivolous, entertaining, creative, and ultimately educational choices by teachers. From unethical marketing campaigns in pharmacology to

combatting terrorism in cell biology, our teachers made weird and wonderful choices. They also created an environment of inquiry that permitted us to subvert other aspects of our education, including our values and choices.

These teachers modelled an inspirational attitude that had a formative impact on our careers and personal lives. They could do so because, in the classroom, they had the academic freedom to engage with their students as they saw fit. That freedom provided privilege—and responsibility—that was, to some extent, insulated from evaluation and assessment concerns. This meant that learning was deliberately challenging, that it veered away from the formal curriculum, and that it was unpredictable—and ultimately rewarding. In short, it mirrored the process of scholarship and critical thinking. Marks and assessments were secondary to understanding how to think using a particular set of concepts and ideas.

Not all teachers took advantage. Not all teachers were, nor were they required to be, subversive mentors. And indeed, some abused this freedom. However, most understood their responsibility, especially in workplace and experiential learning. Many teachers communicated the subversion of standards and guidelines as a necessity of day-to-day practice in the health professions. Reality rarely matches the randomized control trial. Clinical teachers play an important role in explaining this to naïve students who have memorized protocols and guidelines. This is subversion from one perspective. From another, it is the adaptive and flexible application of expertise that we want role modelled.

Unfortunately, those who were once encouraged or even permitted to be subversive agents within the curriculum are now the black sheep—and a vanishing breed at that. An excessive zeal for standardization has seen to that. Standardization exerts pressures in a few different and synergistic ways. Firstly, there is standardized curricular content and, more significantly, standardized assessment approaches mandated by thought leaders and institutionalized by accreditation processes. Secondly, there are standards and

guidelines for how teachers should *teach*, including pedagogical principles and practices derived from research. These are often derived from good evidence but are translated into inflexible policies and procedures to which faculty must adhere. In my own field, aligning faculty with the new curricula based on these models is a major priority. Thus, faculty development is a ubiquitous obsession with most medical schools I've encountered. And, inevitably, when curricula fail to deliver on lofty promises, the blame is assigned to teachers who failed to be 'developed.' The so-called 'best principles' and 'best evidence' can trump years of hard-won experience and inspiration. Thirdly, there are ubiquitous standards for evaluation of teaching by students. These evaluations are demonstrably unreliable and tend to measure ease of course material and student satisfaction rather than true learning. These evaluations also form the basis of academic merit despite good evidence showing that standardized evaluations of 'teaching effectiveness' neither assess teaching nor effectiveness. All of these pressures force teachers to toe the line despite their own inclinations. There is little room for questioning the science behind the cholesterol hypothesis in first year physiology when the tutor guide and assessment materials dictate the pace and speed of what is to be covered. Teachers who display their Cat-like creativity are culled. We are left with only Sheep to guide sheep.

At this point, I will confess that I, too, am part of the problem. As a health professions education researcher and advocate of 'evidence-based education,' much of the academic work I engage in has the effect of narrowing the range of options to teachers. This is not intentional—the work my colleagues and I engage in is about broad principles of learning rather than any one particular form or format of pedagogy. Still, the uptake of theoretical principles is only through concrete instantiations that become conflated with underlying evidence. Education is an activity with a broad range of possibilities. And yet, the tendency to embrace the 'best evidence' has the result of narrowing our options. The consequence is a

limiting of the ability of teachers to challenge and inspire subversion in students.

If we can agree that we want independent, creative thinkers who can challenge and advance the health professions, then we have no choice but to accept that our curricula must allow room for challenge, critique, and countervailing viewpoints. In other words, we need to create room for subversion. Empowering students to question knowledge and their teachers is an act of professional self-preservation. Students need mentors, role models, and exemplars in this endeavour. They need to be able to identify with their teachers if we want them to develop a critical disposition to practice. However, as long we put in place processes and structures that reward teachers who are Sheep-like, we will train Sheep-like students.

Cats can be unpredictable and anarchic. This is a scary thought for administrators and accreditors. But on one account, the pundits are right: the future challenges of healthcare will not be solved by Sheep-like thinking.

References

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

18. Subversive Learning

P.K. Rangachari

The following conversation took place in our studios a few weeks ago. The President of the Student Union (PSU) was talking to Dr. Agni, one of the more senior members of the Faculty. The University had been in turmoil, with students vociferous in their complaints about the Faculty. They felt strongly that the University was selling itself as a business and the proliferation of CEOs, Vice-Presidents, and Presidents ignored student concerns. They felt that a move to more student-centred learning was essential. Copies of the decades-old Postman and Weingartner book, *Teaching as a Subversive Activity*, were being circulated. Due to a technical glitch, the early part was not recorded, so the conversation starts abruptly in mid-sentence.

Agni: Students are not passive listeners in the classroom. They are often actively disengaged. The internet is a boon! Surfing from their seats is simple. The poor teacher drones on, PowerPoint is powerless, nothing registers as students think other thoughts. They are still in control, despite the teacher's best efforts. Subversion in practice!

PSU: So, you think that student-centred learning is nothing new?

Agni: That too is a buzzword and I am not sure what it means in the end. There are three parties to the educational enterprise, at least in the modern university—the teachers, students and society—they don't necessarily see education the same way. So, tensions emerge. Centering learning towards one group or the other disturbs the equilibrium and leads to dissonance.

PSU: But aren't students the central item in a university. Shouldn't their rights be paramount?

Agni: Agreed. Universities exist because students enter them, so they are central to any university, the raison d'être, as it were. Why they do that is the crucial issue and so it is not so clear

cut. By the way, the language of rights makes me very uneasy. Though often couched in the language of justice, there is always the faintest whiff of smug self-indulgence. If I had my way, I would expunge that word and replace it with privileges since that evokes responsibilities. Instead of my saying that I have a right to this, that, or the other, I should say I am privileged to have these facilities, so how can I function effectively to fulfil my obligations. Teachers should tell themselves that since they are privileged to teach the next generation, how can they best serve their students. In some ways this is similar to the issues facing physicians dealing with patients. We can think about student care as we would patient care, where the elements often considered are beneficence, autonomy, and justice.

Agni: Beneficence implies that you do all you can for the benefit of the student or, as the Hippocratic dictum would have it, "do no harm". Autonomy is respecting the student's capacities to decide for themselves, and justice implies treating all students equally.

PSU: Put that way, it seems obvious, so why is that difficult?

Agni: Beneficence looks self-evident, but how it plays out in specific circumstances poses problems. Students enroll in courses that have specific objectives. If it becomes evident early on that the material is well beyond a particular student's capabilities, should one fail the student, advise him to leave, or just give him marks because he tried hard so that he does not feel discouraged. Are we benefitting him by letting him linger on? Teachers try hard to be nice, but that is a four-letter word and like other four-letter words implies a lot. Other examples arise. Most teachers are good at dispensing information and believe that they are helping their students. Would it not be better if they did not but spent more time and effort in inculcating skills that may be more relevant? The buzz around flipped classrooms suggests that many are beginning to see it that way. We can best prepare our students for uncertain futures by making them resilient. That may require us to make more demands on them, by provoking them, in fact stressing them to make them uncomfortable. Can we be cruel only to be kind? Sadly,

with the excessive caution about trigger warnings and so on, we are going out of our way to mollycoddle our students—a wimpfication of the future!

PSU: Well, not sure that many students would go along with that. You mentioned autonomy and I presume you mean giving them license to make decisions.

Agni: Yes, and in a modern University, students do have considerable autonomy—they can select courses, take electives, time off, do part-time courses. All of that adds to their learning experience and no one could cavil at that. There are situations, though, where teachers run into difficulties. *If* we want to foster student autonomy, we must respect their individual aspirations and idiosyncrasies. Laudable aim but difficult to institute in practice. Consider differences in learning styles, which have been well documented. How are teachers to cater to different learning styles in large classrooms, where they barely know the names of their students, let alone individual idiosyncrasies? Evaluation proves trickier since not all students do equally well on the same set of exams. I have had students who have surprised me by their capacities to stretch themselves and hand in reports I never thought they were capable of based on their performance in the classroom setting. Teachers must set up different evaluation procedures so that students can be given an opportunity to display their strengths, not just expose their weaknesses. So, in the interests of both beneficence and autonomy, teachers should adapt their approaches to cater to suit differences in learning styles and assessments. This is practically impossible to achieve under most circumstances where resources are often limited, even in the wealthiest countries. This is where the notion of justice enters—treating all students equitably becomes difficult in practice. Physiologists are quite familiar with the notion of scaling (they use the term allometry). As size changes, operations alter. There is a scale problem in teaching. What is possible in a small tutorial group becomes difficult in mid-size classes and well nigh impossible in larger ones. Again, given pressures of time and resources, these worthy aims may be very

difficult to achieve. Remember that universities do not exist in isolation, so both teachers and students are answerable to the public that provides much of the infrastructure that allows such institutions to function. Standardized testing is an attempt to bring some justice into the picture, though that itself creates more problems. A standards-based world may solve institutional problems but deprive students an opportunity to deal with ambiguities which abound in the world outside the hallowed halls of academe.

PSU: I am taken aback with your pessimistic views. Are you saying that subversive teaching cannot achieve much?

Agni: Not at all—I am optimistic and quite hopeful but am merely trying to present a more complete picture. Postman and Weingartner strongly favoured a system that allowed students to recognize the foibles of their own culture and upbringing, creating, in a sense, an ever-renewing society. The sad part is that the subversive of today becomes the pillar of the establishment of tomorrow and resists change. The life span of subversion is limited. History provides many examples. In the Western world, I cannot think of a more subversive teacher than Jesus Christ, a superstar. Yet the movement he started has not been free of blemish. I think it was Quigley who emphasized that the instruments of expansion of one generation become vested interests of the next. Progressive instruments get institutionalized and fossilized. Progress is not a scalar entity but a vector with both magnitude and direction. What results is really the resultant vector of many forces. My defense of radical politics is that it serves to polarize the vector and pushes it in the direction of overall human progress. The old notion (sometimes attributed to Hegel, perhaps wrongly) of a thesis provoking an antithesis to a newer synthesis still has merit.

PSU: What, then, is the value of subversive teaching?

Agni: The issue is not subversive teaching at all but subversive learning. Students should recognize the forces that shape the world, the value of change, and the limits. They should remain vigilant—follow Hamlet's advice and defy augury. The readiness is all.

References

Mueller G.E. (1958). The Hegel legend of "thesis-antithesis-synthesis". *J History of Ideas* 19: 411–414.

Postman, N. & Weingartner. (1969). *Teaching as a Subversive Activity*. New York, NY: Delta Publishing Co., Inc.

Quigley, C. (1979). *The Evolution of civilizations: an introduction to historical analysis.* Carmel, IN: Liberty Press.

Josep-Eladi Baños

Josep-Eladi Baños is an M.D. from Universitat Autònoma de Barcelona. He received his Ph.D. degree in Medicine (Pharmacology) at Universitat Autònoma de Barcelona, was a visiting researcher at CNRS (Gif-sur-Yvette) and the Allegheny University of Health Sciences (now Drexel University in Philadelphia), and was a visiting professor at Universidad de Chile and Università di Firenze. He served as Vice-Dean and Vice-Rector of Teaching and Academic Affairs at UPF. He was Executive Secretary of the Spanish Society of Pharmacology and the Director of its Teaching and Learning Commission. His interests are focused in the use of active methods in teaching health science students, and the contribution of medical humanities (mainly literature, history, cinema, and ethics) to the training of medical students. He has (co-)authored more than 100 publications devoted to educational issues. He has received several awards for his contributions in education, including the Prize of the Spanish Ministry of Education for teaching innovation and the Generalitat de Catalunya Vicens Vives Award for professional achievement. He chairs the Margalida Comas program for the improvement of teaching and learning in Catalan Universities of the Generalitat de Catalunya. He has been Professor of Pharmacology at Universitat Autònoma de Barcelona and Universitat Pompeu Fabra. He is president of the Universitat de Vic – Universitat Central de Catalunya (Vic, Spain).

Krish Bilimoria

Krish Bilimoria is a second-year medical student at the University of Toronto and Junior Fellow at Massey College. He completed his Bachelor of Health Sciences degree in Global Health at McMaster University. He has worked broadly across research in genetic and molecular epidemiology, global health impact investment, and global health ethics. At the University of Toronto, he served as a teaching assistant for HST 440 (Health and Pharmaceuticals), and at McMaster, he served as an undergraduate teaching assistant for

HTH SCI 2Q06 (Patient Care in a Historical Context), and HTH SCI 4TE3 (The Teaching Hospital). His current research interests include exploring Bayesian methods of clinical trial analysis, reproducible clinical research, and diagnostic reasoning.

Damien Joseph

Damien is a recent graduate from the Honours Life Sciences program, currently pursuing a career within the field of digital health with a particular interest in knowledge translation. He hopes to be able to play a part in bridging the gap between research and clinical practice. His interest in this work stems from his passion for making education more widely accessible and relevant to every individual, which led him to the work of Dr. Del. Damien deeply resonated with Dr. Del's mission to shake the world of education to its core in his push for student-centered learning—breeding numerous leaders and change-makers along the way. In his spare time, Damien continues to work towards his goal of making education more accessible through his blog and podcast. This work is particularly geared towards young adults, with the mission of aiding their growth into healthy, wealthy, and wise adults.

Brian D'Monte

As an undergraduate alumnus of the All-India Institute of Medical Sciences, New Delhi, India, I vacillated between psychiatry and biochemistry as a postgraduate specialty before finally choosing the latter. A fortunate choice, because although research was what drew me to biochemistry, it was undergraduate teaching (oops!) that attracted me the most. In the middle of an experiment one day, I was asked to stand in for a colleague to deliver a lecture to the students. I will never be able to fathom why I agreed, but I did; however, my 'lecture' was not a monologue but, instead, a two-way discussion and exchange of ideas between them and me. Both parties enjoyed it—I suspect I more than they. I gave up test tubes and ultracentrifuges thereafter and spent my academic life in the company of undergraduates, during which time, together, we learned a little about the biomedical sciences and a lot about life. Constantly under the threat of never rising in the ranks of the

faculty on account of the publish-or-perish syndrome, I remained amongst the lower echelons. Nevertheless, I was very satisfied with being in the exalted company of students—as I remain to this day. If I were given an opportunity to relive my life, I'd do precisely the same; I have led a privileged existence in the company of my fellow learners.

Many dear people have shaped my behaviour, and in doing so have shaped my interactions with students: my father with his love of books, my mother with her ways of dealing with life, my uncle Aloy Dyer and his daughter Marilyn, my daughter Sunita and Zoltan, my son Sunil, and my grandchildren Jasmine and Rohan, as well as Chari and G.P. Talwar.

Chaya Gopalan

Dr. Chaya Gopalan earned her Bachelor's and Master's degrees from Bangalore University, India and received her Ph.D. in medical physiology from the University of Glasgow, Scotland. Upon completing two years of postdoctoral training at Michigan State University, she began her teaching career at St. Louis Community College. She wanted to experience teaching at a professional school and hence joined the St. Louis College of Pharmacy and later moved on to the departments of Applied Health, Primary Care, and Health Systems at Southern Illinois University Edwardsville. Her teaching is in the areas of anatomy, physiology, and pathophysiology at both the undergraduate and graduate levels. Dr. Gopalan has been practicing evidence-based teaching using team-based learning, case-based learning, and most recently, the flipped classroom techniques. She has received several grants in support of her research interests. In 2020, Dr. Gopalan was named the American Physiological Society's Arthur C. Guyton Educator of the Year.

David M. Harris

David M. Harris has been an Associate Professor of Physiology at the University of Central Florida College of Medicine since 2011. Previous to that, he was at the Drexel University College of Medicine. He has led the medical physiology courses at both institutions and has experience in three different type of curricula.

He is a proponent of student-centred and active learning methodologies and has published over 10 articles on these methods. He is an active member of the American Physiological Society (APS) and the International Association of Medical Science Educators (IAMSE). He currently serves as an Associate Editor for Advances in Physiology Education and BMC Medical Education. Dr. Harris is one of the basic science leaders for the Aquifer Sciences Initiative, has served as the physiology lead to develop that curriculum, and currently serves as the Editor in Chief for it. The purpose of the curriculum is to facilitate the integration of basic and clinical science to promote safe clinical decision-making. Dr. Harris has been recognized by the APS, IAMSE, and at UCF for his innovative teaching and mentorship to medical students.

John G. Kelton

Dr. John G. Kelton, Distinguished University Professor, is the Executive Director of the Michael G. DeGroote Initiative for Innovation in Healthcare at McMaster University in Hamilton. He took the role after completing, in June 2016, a 15-year term as the McMaster's Dean of the Faculty of Health Sciences and Vice-President for Health Sciences. He had also concurrently been the Dean of the University's Michael G. DeGroote School of Medicine. During his term, McMaster rose to be one of the top 40 universities in the world in medicine and health sciences.

Dr. Kelton has an active clinical practice as a hematologist, along with an internationally-recognized research program into platelet and bleeding disorders. In recognition of his research, clinical, and administrative achievements, he has received three honorary degrees and is a member of the Order of Canada.

Jonathan Kibble

Jonathan Kibble received his Ph.D. in physiology in 1994 from the University of Manchester. He has held previous faculty positions in the United Kingdom (University of Sheffield), the West Indies (St. George's University, Grenada), and in Canada (The Memorial University of Newfoundland). He is currently a professor of physiology at the University of Central Florida, College of Medicine

in Orlando, Florida. Jonathan was recognized by the American Physiological Society in 2018 as the Arthur C. Guyton Physiology Educator of the Year and also received the Association of American Medical Colleges, Alpha Omega Alpha, Robert J. Glaser Distinguished Teacher Award in 2015. Jonathan is author of the textbook *Medical Physiology, The Big Picture*, and his research centres around assessment for learning.

Debra Klamen

Debra L. Klamen, M.D., M.H.P.E, F.A.P.A. is Professor and Chair of the Department of Medical Education at Southern Illinois University (SIU) School of Medicine. She is also the Senior Associate Dean for Education and Curriculum. Until December 2003, she was the Director of Undergraduate Medical Education in Psychiatry at the University of Illinois at Chicago and the Associate Dean for Curriculum. Dr. Klamen earned her Bachelor's degree in Genetics at the University of Illinois at Champaign-Urbana and her medical degree at the University of Chicago Pritzker School of Medicine. She completed a Psychiatric residency at the University of Illinois at Chicago and was chief resident her last year there. She completed a Master's of Health Professional Education at the University of Illinois at Chicago in 1998 and was named a Fellow of the American Psychiatric Association in 1999. Dr. Klamen serves on the Communication Task Force of the National Board of Medical Examiners and developed and implemented a qualitatively different third year of medical school. Dr. Klamen has written numerous articles on medical school education, particularly in the area of performance evaluation and assessment. She has spoken extensively on the topic of stress management for physicians around the country. Dr. Klamen's interests include PBL, innovative curricular change, and clinical performance assessment. In her free time, Dr. Klamen likes to travel and competes nationally in the sport of dressage.

Joshua Koenig

Joshua Koenig is an instructor in the Bachelor of Health Sciences Program at McMaster University and a Ph.D. Candidate in the

Department of Pathology and Molecular Medicine studying Immunology. In his research life, Joshua studies the emergence of allergen-specific IgE antibodies early in allergic immune responses. In his teaching endeavours, he primarily engages in alternative education (i.e., inquiry, PBL, group, discussion) in the realms of immunology, child health, and cell biology. Joshua's educational practices focus on treating many society-level issues as educational issues, working to assuage power imbalances through educational techniques that prioritize individual growth, introspection, and community. Presently, Joshua is working to highlight and deconstruct discriminatory educational practices that violate Canadians' fundamental right to equal education—principally those that affect students with disability and mental health considerations.

Kulamakan (Mahan) Kulasegaram

Mahan is a graduate of the BHSc program (2009). He is currently an Assistant Professor in the Department of Family & Community Medicine and an Education Scientist at the Wilson Centre at the University of Toronto. His interest in education as a field and an area of scholarship began during his time in the BHSc program. He continues this interest professionally as a researcher and consultant in health professions education. Like Del, he has a low tolerance for horseshit of which there is a lot in the education literature.

Chiu-Yin Kwan

I was quite lucky to join McMaster University as a postdoctoral fellow immediately after completing my Ph.D. at the University of Pennsylvania in 1976. This was less than a decade after McMaster University initiated an innovative approach to medical education, now known globally as "Problem-Based Learning (PBL)", which is self-directed and student-centered. As a postdoctoral fellow conducting smooth muscle research, in preparation for an academic career, I volunteered to "teach" medical students using the PBL format, albeit with much skepticism. I soon realized that my students learned quite well, even without my teaching. In no time, I was fascinated by PBL as an active-learning, adult-learning, and

life-long learning approach in which tutors are actually on par with students, and in which tutors and students engage in self-directed learning together. Not only was the PBL approach effective, it was also fun and satisfying, all while supplying me with new knowledge. I later served as a PBL tutor trainer for visiting educators worldwide, especially those from Asia where PBL was considered a relatively novel and even strange "teaching" concept. From 1992–1997, I took a leave-of-absence to accept a post as Chair of Physiology at the University of Hong Kong, where I successfully helped place PBL in medical education. Upon returning to McMaster, for two consecutive years, I was nominated for an award of excellence for PBL tutoring by the medical students and eventually received the honor in 2002. Increasingly, I developed a personal passion to promote PBL in medical education in the Asia-Pacific region, so much so that I took an early retirement to move to Taiwan where I helped lay the foundation for PBL and established the Center for Faculty Development at China Medical University in Taichung, the first centre of such a nature in medical schools in Taiwan. To this date, my ardent passion for the promotion of PBL in Asia seems to be insatiable and continues to expand across China, although with unknown and unpredictable outcomes.

The MacPherson Institute

The Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching and Learning is the central teaching and learning unit at McMaster University. The staff at the MacPherson Institute collaborate to explore, enhance, support, and recognize teaching and learning experiences at McMaster. We offer a wide variety of programs, workshops, services and supports to all members of the McMaster community to cultivate an environment where learning deeply matters, and teaching is valued and recognized. Our staff have a wide range of expertise in areas of educational scholarship, educational technology and educational development.

Dr. Erin Aspenlieder is the Associate Director of Program and

Educational Development; Dr. Elliot Storm is a Lead Educational Developer working with the Faculty of Humanities and leading work with Educational Development Fellows; Jenny Blaney is an Educational Developer supporting initiatives around student wellness, teaching awards and mentorship; Dr. Alise de Bie is a post-doctoral fellow with the MacPherson Institute whose research is focused on advancing equity and accessibility in teaching and learning.

Ashley Marshall

Ashley Marshall is a professor of communications at Durham College and former instructor for OntarioTechU's Faculty of Humanities. Her work seeks to make visible how and why the city is (re)produced in specific ways so that students can better understand the way that built space intersects with social and political forces; and to provide a resource for students to intervene into this system and engage in their own forms of collaborative "city-making." Her most recent work on space-based pedagogy focuses on the way culture is constructed in the everyday situations individuals participate in, and thus expands in the interaction between communities and structures of hierarchization. She deconstructs and interrogates hegemony and cultural accumulation by dispossession. Such a dialectical process creates possibilities for resistance and disruption, and thus new modes of being and seeing. A post-secondary lecturer since 2014, Ashley has valuable experience designing and delivering robust content surrounding liquid modernity, and engaging students to see and live more critically. Her project is a defense of the heuristic nature of art, a force that inspires freedom, imagination, and self-actualization for communities and individuals.

Mathew Mercuri

Mathew Mercuri completed his Ph.D. in Health Research Methods at McMaster University, followed by a postdoctoral fellowship in the Department of Medicine at Columbia University. In addition, Mathew holds faculty appointments within the Institute of Health

Policy, Management and Evaluation and Victoria College at the University of Toronto and is a Research Associate at the Institute for the Future of Knowledge at the University of Johannesburg. Dr. Mercuri is currently pursuing a second Ph.D. at the Institute for the History and Philosophy of Science and Technology (University of Toronto). In addition, he is the Editor-in-Chief for the Journal of Evaluation in Clinical Practice. Mathew's research interests are focused on variations in medical practice, issues around radiation exposure from diagnostic imaging, and medical epistemology.

Sean Park

Sean Park, Ph.D., M.A. BHSc. (Class of '04) unknowingly began his life-long love affair with education, teaching and learning in 2000. As part of the first cohort in the BHSc program at McMaster University, he had a disorienting and life-changing foray into inquiry-based learning under the guidance of Dr. Del Harnish. After dropping out of law school, Del offered Sean opportunities to run a range of educational 'experiments' with complexity theory and inquiry, leading to his M.A. degree in Education at the University of Toronto. Sean's next adventures into theatre, Daoist martial arts, psychotherapy, and Buddhist meditation unleashed a fervour for holistic education, contemplative inquiry, and creativity, and he holds a Ph.D. at Simon Fraser University in Arts Education with a specialization in curriculum theory and implementation. Further training in cybernetics and global healing traditions with Drs. Bradford and Hillary Kenney continues to disrupt and guide his educational practice and scholarship. Sean is currently an Assistant Professor in Medicine at McMaster. He lives in Hamilton with his wife and two children and can often be found playing in the streets with the Hammer City Samba community orchestra.

P.K. Rangachari

P.K. Rangachari Professor (Emeritus) Medicine at McMaster University has a medical degree (All-India Institute of Medical Sciences, New Delhi, India, Ph.D. in Pharmacology, U. Alberta). His post-doctoral research at the Cardio-Vascular Research Institute, San Francisco, California, Hopitaux Necker and Bichat, Paris,

Harvard Medical School and Beth Israel Hospital, Boston involved ion transport and inflammatory mediators. He has taught in a variety of programmes—undergraduates (health sciences, life sciences, Arts and Sciences), medicine, nursing, physiotherapy, pharmacy, and biomedical engineering—for 30 years at McMaster University. He has published papers on ion transport and education, has organised teaching symposia for ASPET, APS and IUPHAR, and has participated in workshops on problem-based learning in a number of countries. He has co-authored several books, including *The Design of Smooth Muscle* (Grover, Rangachari), *Problem-Based Learning in Medicine* (David, Patel, Burdett, Rangachari), and *Students Matter: The Rewards of University Teaching* (SIU School of Medicine) which was edited with Kevin Dorsey and which has been translated into Japanese and Chinese as well. He was the Claude Bernard Lecturer for the American Physiological Society in 2010.

Stacey A. Ritz

During my undergraduate degree in biology at McMaster in the 90s, I had the great good fortune of encountering Del Harnish early and often—first as the professor of my 2nd year Cell Biology course, then around the Life Sciences Building when I worked in one of his colleague's labs for the summer, and then as my 4th year virology prof and co-supervisor of my 4th year thesis in allergy and immunology. Del demonstrated for me that university teaching didn't have to be formulaic, didactic, or impersonal. As a mentor in a course on teaching in higher education, and as the first Assistant Dean of the BHSc (Hons) Program, Del gave me opportunities to develop as an educator, including teaching in the nascent years of the program. After a post-doc at UCLA and 10 years at Canada's newest med school (the Northern Ontario School of Medicine), I had the honour of returning to McMaster and attempting to fill Del's shoes as his successor in the BHSc (Hons) Program starting in 2015. Although my scholarship began in the field of allergy and immunology and the influence of air pollution on the immune system, my focus now is on the incorporation of sex and gender

considerations in experimental biomedical research, and the use of critical discourse analysis as an educational tool.

Felicia Vulcu

I am an Associate Professor (teaching) in the Department of Biochemistry and Biomedical Sciences (BBS) at McMaster University. My primary teaching focus is on laboratory-based courses and curriculum design. My teaching practices focus on three central tenets: safety, respect, and positivity. I constantly strives to create safe, nurturing environments conducive to life-long learning. Highlights from my current teaching portfolio include the creation of an 8-month-long undergraduate laboratory course (2nd year) aimed at introducing students to a directed research project. I use a number of teaching practices such as team think tanks, flipped-classroom case studies, and Labster virtual labs. In the last five years, I was fortunate enough to be part of the design and implementation of a brand new program launched by the BBS department: Biomedical Discovery and Commercialization (http://bdcprogram-mcmaster.ca). I have also created a Massive Open Online Course (MOOC) called DNA Decoded. The course was created in collaboration with Dr. Caitlin Mullarkey, MacPherson Institute, and Labster virtual labs. It is currently featured on the Coursera platform.

Check out the DNA Decoded course: https://www.coursera.org/learn/dna-decoded

Check out the DNA Decoded course trailer: https://www.youtube.com/watch?v=wEFaPccIE9Y

Harold B. White, III

Professor Emeritus Harold B. White, III graduated with a degree in biochemistry from Pennsylvania State University. He joined the Department of Chemistry and Biochemistry at the University of Delaware in 1971 after a postdoctoral research fellowship in Chemistry at Harvard University and a Ph.D. in Biochemistry from Brandeis University. His research interests were in the structure, function, and evolution of vitamin-binding proteins. He was one of the early advocates of RNA enzymes. After the mid 1990's, his

interests focused on undergraduate education. Between 1994 and 1998, he served as Principal Investigator on Delaware's first NSF/DUE grant on Problem-Based Learning (PBL). As a member of the Education and Professional Development Committee of the American Society for Biochemistry and Molecular Biology (ASBMB) and the Institute for Transforming Undergraduate Education, he conducted numerous PBL workshops. As an associate editor for Biochemistry and Molecular Biology Education, he wrote commentaries on PBL. Hal received the College of Arts and Sciences Outstanding Teaching Award in 2005 and the Howard Barrows Award for exceptional undergraduate teaching from McMaster University in 2011. In 2013, he was named Delaware Professor of the Year and elected as an AAAS Education Fellow. He was honored with the 2014 ASBMB Award for Exemplary Contributions to Education and the 2015 Delaware Bio Educator of the Year Award. For 18 years, he directed Howard Hughes Medical Institute's Undergraduate Science Education Program at the University of Delaware. Regionally, Hal is known as an expert on dragonflies and published a book on the *Natural History of Delmarva Dragonflies and Damselflies*.