

Can College be a Creative Environment? Reimagining our Teaching Practices

We need creative individuals to find solutions to the serious societal and environmental problems that humans are currently facing. Creativity has become a buzzword in the larger-than-life companies that lead in technological innovation, and job markets are constantly expressing their need for creative workers who can propose innovative approaches to grapple with new challenges. Creativity is an overarching concept that is also applicable to our personal lives: creative individuals might be better equipped to have more fulfilling life experiences than their less creative peers. There seems to be a consensus on the importance of creativity. It is like apple pie: everybody likes it, right?

The abstract character of the visual arts can provide new insights and shed light on counterintuitive scientific concepts which stem from formal, conceptual structures that do not arise spontaneously in the everyday experiences of learners.

If everyone agrees on the importance of creativity, why is it so difficult to incorporate it into our educational system? There are two pervasive ideas in education that abort the discussion at its inception. The first claims that creativity cannot be taught, instilled, nurtured, developed, or cultivated. The second purports that creativity is innate—either you have it, or you don't. Being an enthusiast of creativity and not believing that it is innate, I would like to share my experiences exploring it in science courses at Vanier. Though my journey is entirely personal, it is my hope that sharing it will provide food for thought to those who are interested in exploring such approaches in their teaching practice and that it will stimulate reflection among those who are curious about this fascinating topic.

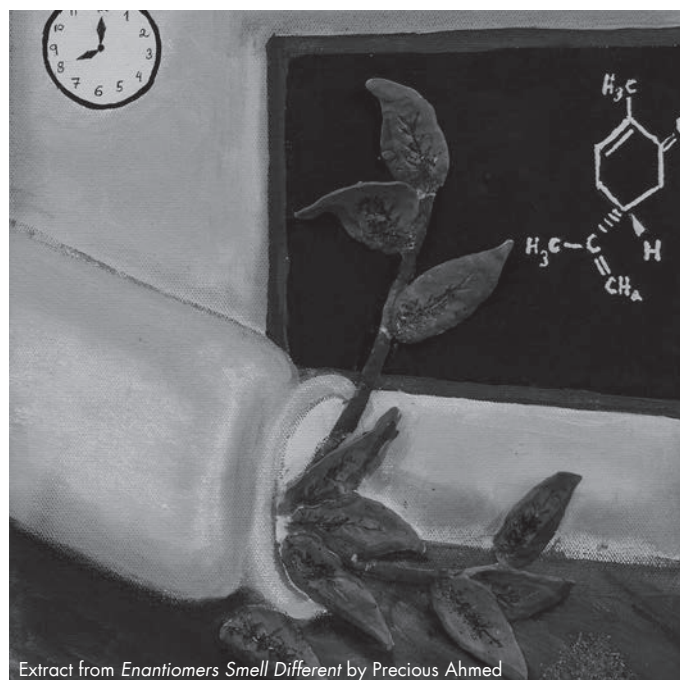
I was educated in Brazil, and I completed my graduate studies there in 1996. After teaching chemistry in Brazilian high schools and universities, I moved to Canada in 2000. I started working at Vanier in the summer of that year. After spending a few years adjusting to my new teaching environment, I felt a need to reinvent my teaching practice—mostly because I believed that there had to be better approaches than those that I was applying. I did not know exactly which direction this change would take me in until I read Kieran Egan's books on imaginative education (Egan, 1997; Egan, Stout, & Takaya, 2005). Although imagination and creativity are not synonymous, there is a link between the two. Creativity entails an interaction between attitude, process, and environment that leads to

the inception of something new and useful; but to create something, one first needs to *imagine* it. Imagination is the capacity to conceive of what does not yet exist, and creativity is applied imagination.

Egan and his peers at Simon Fraser University's Imaginative Education Research Group (IERG) emphasize the crucial role of the narrative in providing engagement to knowledge. "A narrative is a continuous account of a series of events or facts that shapes them into an emotionally satisfactory whole" (Egan, 2005, p. 99). They propose a counter-intuitive idea: instead of starting with what students *know*, we should start with what they can *imagine*. The idea that imagination can

open the doors of perception so that creativity and effective learning can occur resonated well with my own beliefs. During my childhood, I experienced the power of children's books that were full of animals that could talk; though, many of them—like dinosaurs—were long extinct, their adventures planted seeds of wonder in my mind, and my emotional engagement with the characters fostered learning.

During adolescence, I felt similar transcendence to imaginary worlds while reading the stories of Edgar Allan Poe, H. P. Lovecraft, and Ray Bradbury. Reading Bradbury's *The Martian Chronicles* was a transformative experience that initiated my lifelong



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interest in astronomy, space exploration, and the natural sciences and that can still be seen in my teaching practice today (Lima, 2017). As a student, I often wondered why school had to be so boring, so mind-numbing, so depleted of the excitement that those imaginative experiences provided me.

Egan's writings showed me that a backlash against imagination is deeply entrenched in the ethos of Western thought. Literature on the topic traces resistance to the expression of imagination to Plato's works (Egan, Stout, & Takaya, 2007), and from them, its broad ramifications reach pedagogy through the works of, for example, the influential psychologist Jean Piaget (Egan, 1997). With the exception of those working in early childhood education, it seems that teachers (especially those in the natural sciences) have been trained to look down on imaginative approaches for students who are older than toddlers, as if imagination is inferior to rational, Cartesian thought. But time and again, imagination has transcended the educational milieu to become a defining characteristic of the human experience!

The combination of visual images and narratives can connect one's imagination and identity by carefully crafting a collection of intermingled narratives with suggestive, powerful images. No wonder graphic novels have legions of fans. Imagination can be a powerful tool to engage with a world in flux as we project our dreams and expectations into the future.

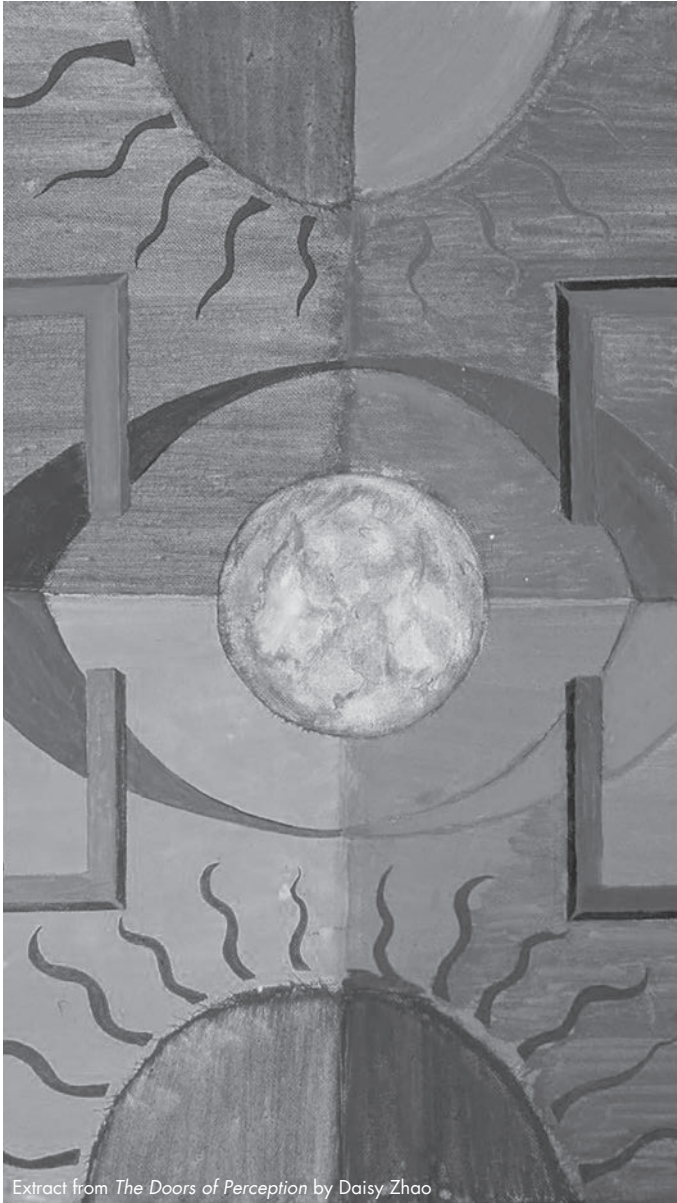
While starting to think about ways to bring the IERG's ideas to my practice at Vanier, I stumbled across Ken Robinson's ideas about the crucial role of creativity in education. With almost 54 million views so far, Robinson's TED talk *Do Schools Kill Creativity?* offers a critique of traditional schooling by emphasizing the necessity of rethinking a system that has historically valued the arts less than math and the natural sciences (Robinson, 2006). These ground-breaking ideas kept me thinking about the hurdles that I had to overcome to

prepare a creative/imaginative environment for students in higher education. I did not want to surrender to the idea that most schools are doomed to be places that kill imagination, as Robinson claims.

The opportunity to incorporate creativity and imagination into my courses arose in 2009, the first time I taught *History and Methodology of Science*, a course for Liberal Arts students. Inspired by Egan and Robinson, I proposed a major assignment in which students used the visual arts to portray some of the scientific concepts studied in the course (Lima & Timm-Bottos, 2018). Over the years, I have tweaked the format by including asynchronous dialogues (Lima, 2016) outside the classroom to flesh out ideas and bring concepts to the expected level of complexity. I also felt the need to include art labs (Lima, 2017) and sought the participation of art teachers in the process (Lima & Timm-Bottos, 2018). After a couple of years working with Liberal Arts cohorts, I proposed a similar assignment in my General Chemistry, Solution Chemistry, and Organic Chemistry courses. Science students were asked to express the big ideas (Lima, 2016) and threshold concepts in chemistry through visual arts, and they were required to write a rationale explaining the links between the course content and the visual representations in their final products.

Although scientific knowledge relies heavily on mental models and their visual representations, traditional approaches to teaching science often neglect the crucial role of images in the learning process. Asking students to portray abstract chemical concepts such as atomic models, energy, or chemical bonding using visual representations might help them make the transition from abstract to concrete. The abstract character of the visual arts can provide new insights and shed light on counterintuitive scientific concepts which stem from formal, conceptual structures that do not arise spontaneously in the everyday experiences of learners. Instead of traditional assessments of learning that are commonly used in science courses, this type of student-centred pedagogy requires the development of authentic assessments for learning.





Extract from *The Doors of Perception* by Daisy Zhao

Reflecting on how students construct knowledge in each specific discipline is a transformative experience for teachers.

It is also an opportunity for students to become active in constructing their own knowledge by generating ideas and sharing them with peers. Achieving gains in conceptual understanding as the result of a process of discovery that is mediated by social interactions has been at the core of the frameworks presented in the grassroots works of Lev Vygotsky (Connery, John-Steiner, & Marjanovic-Shane, 2010) and Paulo Freire (1998).

Teachers are expected to be lifelong learners, constantly challenged by exchanging ideas and practices with their peers. Reflecting on how students construct knowledge in each specific discipline is a transformative experience for teachers. This process involves purposeful

interaction, keen observation, multi-sensory exploration, “what if” questioning, connecting seemingly unrelated concepts to create new meaning, and constant self-reflection.

Creativity and imagination have countless facets and nuances. There is no one-size-fits-all recipe. Exploring imagination is exciting work, and it is never-ending. It offers the promise of transforming our schools to fulfill the needs of new generations of students. It is virtually impossible to predict what the world will look like even in the near future; however, it is safe to speculate that, regardless of what lies ahead, creative people will always be in demand.



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