Personal Reflection & Review: Creativity and Innovation

CBU EDUC 6013 – Education for Sustainability & Entrepreneurship

Creativity and Innovation [chapter 4 of O'Brien (2016). Education for sustainable happiness and well-being. New York: Taylor & Francis/Routledge].

The Heart of Innovation in Kelley & Kelley (2013).

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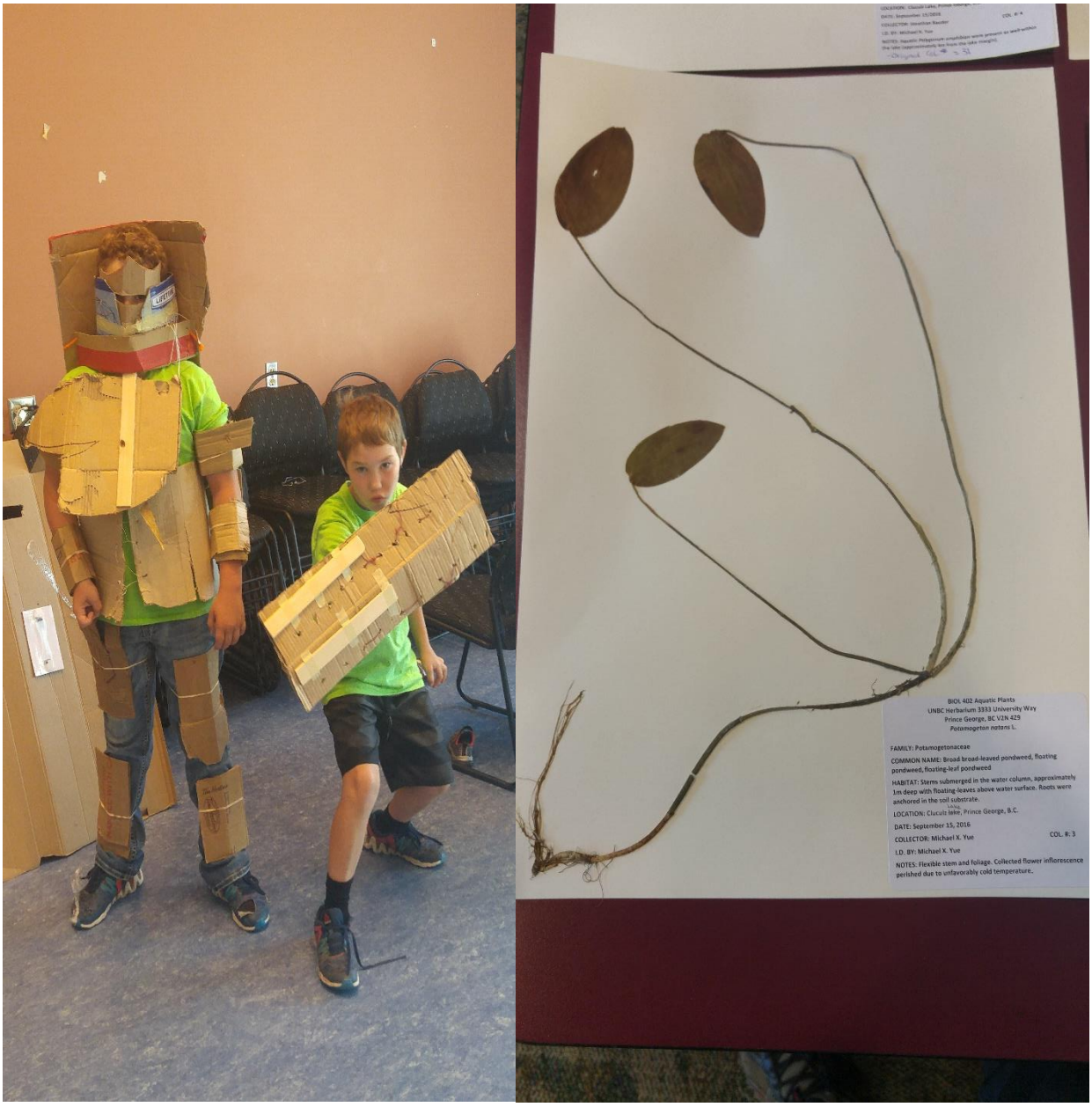
CREATIVITY

Due to the subjective nature of the term, creativity, it is difficult to measure and quantify one's ability be creative. From a personal point of view, creativity is an abstract and spontaneous cognitive phenomenon which synthesises ideologies that are original in nature. As a baseline value for my creativity, I would feel comfortable to give myself a 7 on the creativity scale (1-10). However, even though this magnitude suggests relatively high creativity, I believe that a dynamic scale would be more appropriate. A spectrum between 1 – 10 depending on context, with strong occurrence of high creativity would be a more reflexive and reflective paradigm. By transitioning from a static to dynamic score of personal evaluation, it may foster and promote a growth mindset of learning for both educators and students, indirectly and directly.

NATURE VS. NURTURE

From the perspective and of nature and nurture, I believe that environmental conditions play a larger factor than existing innateness to be creative. From a biological, psychological, and social perspective, creativity is a foundation for curiosity and inquiry – whether that is determining the nature of a black hole or painting. One of the most influential factor which continually affects my perception and mindfulness of creativity is experiential learning. To be immersed and actively learning in a physical place is a spontaneous, reactive, and instinctual. From an educator's perspective, intrinsic motivation for lifelong learners are essential for the future leaders of tomorrow. The pedagogical ideologies have evolved and adapted to new paradigms which have been more progressively autonomous for studential learning. In 1974, Steve Jobs once stayed to stay hungry [and to] stay foolish." I believe that teaching and education, like the quote stated by Steve Job's, is a hopeful reminder for all future leader of tomorrow – creativity, innovation, and drive are the essential characteristics to be an agent of change.

STAY HUNGRY, STAY FOOLISH



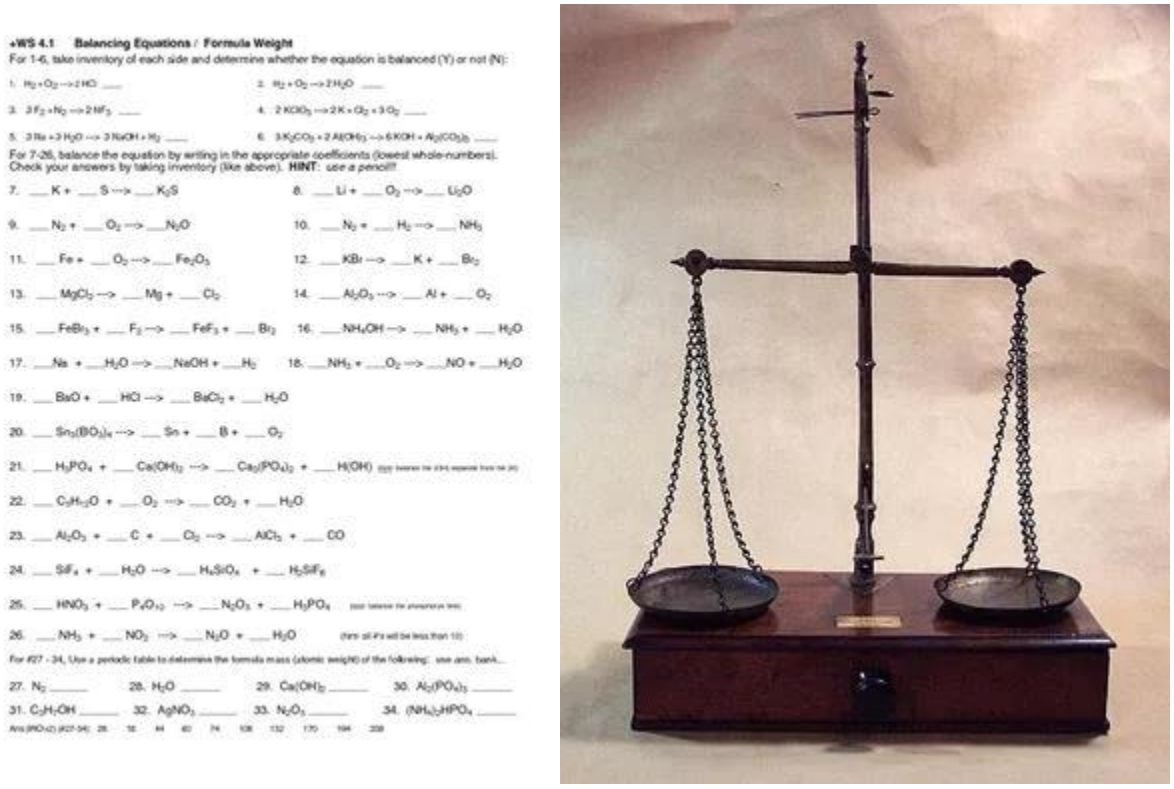
A **B**

Figure 1A. Photographic representations of personal creative initiatives (**A;B**) to empower autonomy, perspective, differentiation, and innovation. **A** represents cardboard-armored dodgeball to inspire creativity through experiential learning. **B** represents an aquatic herbarium specimen which is used for taxonomic and preservation purposes; the organization and display of vegetative structure were autonomously glued by the individual. Image were taken by Michael X. Yue (2016)

PEDAGOGICAL INQUIRY EXAMPLES

(1) Science 10: Introduction into Chemical Balancing

Instead of giving the students a practice worksheet to understand chemical balancing, an inquiry lab to understand and interact with law of conservation was integrated to deliver the lesson plan.

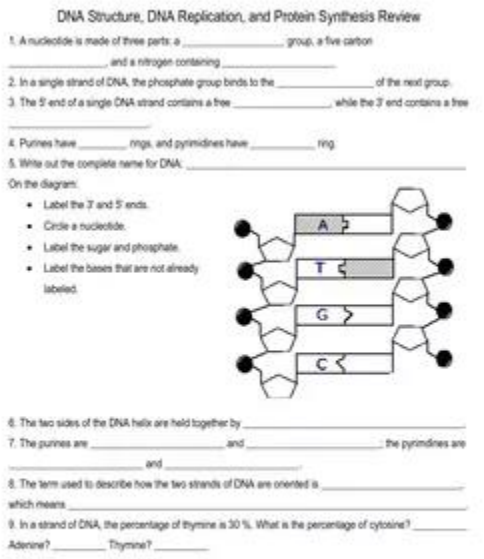


A **B**

Figure 2A. Comparing and contrasting (two) different pedagogical approaches (**A;B**) to learn about chemical balancing. Images respect and abide by the Creative Commons Attribution 4.0 International (CC BY 4.0). Photos of original work in side the classroom setting are not available as they were not taken during that time.

(2) Science 10: DNA Construction

Instead of giving the students a practice worksheet to understand the structure of DNA, an inquiry lab to understand and interact with 3-D modeling was integrated to deliver the lesson plan.



DNA Structure, DNA Replication, and Protein Synthesis Review

1. A nucleotide is made of three parts: a _____ group, a five carbon _____, and a nitrogen containing _____.
2. In a single strand of DNA, the phosphate group binds to the _____ of the next group.
3. The 5' end of a single DNA strand contains a free _____, while the 3' end contains a free _____.
4. Purines have _____ rings, and pyrimidines have _____ ring.
5. Write out the complete name for DNA: _____

On the diagram:

- Label the 3' and 5' ends.
- Circle a nucleotide.
- Label the sugar and phosphate.
- Label the bases that are not already labeled.

6. The two sides of the DNA helix are held together by _____
7. The purines are _____ and _____; the pyrimidines are _____ and _____.
8. The term used to describe how the two strands of DNA are oriented is _____, which means _____.
9. In a strand of DNA, the percentage of thymine is 30 %. What is the percentage of cytosine? _____ Adenine? _____ Thymine? _____

A **B**

Figure 2B. Comparing and contrasting (two) different pedagogical approaches (**A;B**) to learn the structure of DNA. Images respect and abide by the Creative Commons Attribution 4.0 International (CC BY 4.0). Photos of original work in side the classroom setting are not available as they were not taken during that time.

PROFESSIONAL & CREATIVE PLANNING

(1) Integrate Experiential Learning (EL) and Project-based Learning (PBL) in lesson plans

(2) Encourage for more student autonomy in assessments

(3) Provide inspirations and aspirations for exemplar goals to establish expectations for creativity

(4) Foster personal reflection during and beyond classroom time

(5) Formatively (and summatively) assess for creatively and innovation

(6) Provide more visual inspirations of creativity ion my classroom

(7) To have a more dynamic classroom climate

(8) To allow for multimodal variations of assignments submission

CREATIVE IMPAIRMENT: STRUCTURE

Creativity is an individualistic and personal synthesis of ideas which are spontaneous to moments of realizations, critical thinking, and epitome. Regardless of the multitudes of pedagogical restrictions to creativity from both temporal and spatial perspective, structure is the most limiting ideology which is enforced, directly and indirectly. Time productivity is an effective way to mandate completion of tasks in a systematic accordance to a schedule; however, even though this may seem to be optimal and desired, it may be a potentially degrading practice which decreases period within a high school academic course? Time limited pressure is not a reflective nor appropriate estimate of an individual's ability to be creative and innovative. In addition to time productivity, standardization of assessment may be an extremely deleterious practice which erodes the foundations of creativity on a personal level. Due to the summative assessment of correct and incorrect answers, it restricts the ability of students to branch from the desired answers of the examiners. How can creativity and innovation be fostered or evaluated when most standardized assessments ignore and supress individuality in their evaluation? To quote Steve Jobs again, "[To] [s]tay hungry, stay foolish," one must be motivated and native enough to be comfortable with the uncharted. In extremely traditional, educational classrooms, this is often supressed by monotony, structure, scheduling, silence of classroom management and passive learning. Creativity is not something which one's plan for, but rather is a by-product of safe, inclusive, autonomous, and conducive learning environments and climates, which often vary from individual to individual. As long as there remains too much structure, creativity is not a favourable by-product which will be not be forming or fostering in the respective environmental setting.

PERSONAL GROWTH & REFLECTION

Figure 3A. UNBC Active Mind students showing their (elastic) cylindrical racers. Image was taken by Michael X. Yue (2016)

When I was an engineering instructor for the science camp institute at UNBC, students presented the idea of a racing project. From scratch and without researching, we brainstormed a hypothetical design for such a task. We designed cylindrical racers which released kinetic energy from potential energy from the internal elastic bands. All team projects worked, however, we forgot to calculate for frictional irregularity in the grip of the cylinders. As a result, it was difficult for to maintain a straight travel (however one of the cylinders traveled over 30 meters!). In the moment, I thought it was a failure from my perspective, but at the end, all students enjoyed the project and were glad to part of the creation process, regardless if it was perfect or not.

INNOVATION – AN APPLIED BY-PRODUCT OF CREATIVITY

Inspiration, aspiration, wonder – are words of passion and desire to be bold and to be known. I always dreamed of what it was like to be an ant; how they think; how they communicate; how they perceive. How can something so simple show complexity and creativity in a way that is emergent and breathtaking? When creativity is observed, it is known as innovation. Aquaponics, space rockets, wood construction – are a few words which have a large personal, social, economic, and environmental influence. Things of innovation are brief moments of self-actualization and drive which have persevered. In a world which is so miraculous, gorgeous, and magnificent, don't let anyone define your creativity as it is a humanistic tendency to be curious of our surrounding. Stay curious.

Want to stay amazed? Check out one of my favourite YouTube channels (Daily Dose of Internet): https://www.youtube.com/watch?v=8xpWYEokCFU