UBEA Conference: May 9-10, 2019

MacEwan University

KEYNOTE PRESENTATION

Beyond content: investigating student perspectives on research and how students form scientific arguments in biology

Lisa McDonnell; University of California, San Diego

ABSTRACT COMING SOON!

ORAL PRESENTATION AND WORKSHOP ABSTRACTS

Smartphones: The Elephant in the Room?

Randall Barley; University of Lethbridge

Smartphone use in society has increased steadily ever since the introduction of the first iPhone in 2007. Today the smartphone, thanks to the exponentially increasing app industry, has become a seemingly indispensable device in almost every aspect of our everyday lives. Nowhere is this dependence more evident than in the 18-25 age group that we see in our classrooms. While smartphones can certainly be used to enhance learning, a growing number of studies are reporting the negative effects that smartphones are having on students and their ability to learn, both inside and outside of the classroom. Surveys conducted at the University of Lethbridge are revealing that smartphone dependence and addiction levels may be much more serious than previously reported. It also appears that the perpetual distractions that smartphones provide could represent a significant impediment to student learning, student success and overall student mental well-being. Results also suggest that smartphone awareness campaigns may be the best way to empower students to make informed decisions about their device usage, which are more compatible with learning.

Undergraduate teaching assistants for introductory genetics

Mike Harrington; University of Alberta

The Peer Assisted Learning (PAL) program has been running at the University of Alberta for ten years. We recruit and train third and fourth year students to run weekly review seminars for our second year introductory genetics course, BIOL 207. Typically we have three returning and three new PAL TAs each year. Everyone involved in the program benefits: the students (from the regularly scheduled, guided group homework sessions), the PAL TAs (teaching experience and a boost for their CVs), and the instructors (feedback on which topics their students are and are not understanding).

Getting students to write your lectures

Mike Harrington; University of Alberta

Like other instructors, I keep notes on what worked and what didn't work in a lecture so that I can fix things for the following year. I've found that involving students in this process is unexpectedly helpful. I'm quite open about this and reward the students with marks and prizes. Some of the ways I use are:

1. Group questions. Towards the end of a class students work in groups and submit a list of questions for me to answer the next day or online.
2. Clicker answers. If I ask what I think is an easy i>clicker question and everyone gets it wrong I'll go over it, but the next year I have my follow-up ready to go in my lecture notes.
3. Google forms. At the midway or near the end of a course I'll use a Google form to find out which topics the students like and want to hear more of.

4. Clicker questions. The last question on my assignments is for students to write an i>clicker question that would fit into one of my lectures. I add the best ones to my lectures, with permission of the students.
These are some methods and I'm sure audience members will be able to add to this list!

Grassroots program review

Melissa Hills, Danny Braun; MacEwan University

In the 2017/18 academic year the Department of Biological Sciences at MacEwan University initiated a comprehensive program review that is ongoing. The process was initiated when faculty across the department participated in developing Mission and Value statements, and six Program Learning Outcomes. Each of the 56 Biological Sciences courses were evaluated to determine where students were introduced to, developed, and then demonstrated proficiency of those Program Learning Outcomes. The curriculum map generated from this evaluation revealed gaps and misalignments in the program and work is underway to resolve these. Program review is often dictated by administration as part of quality-assurance processes and may be viewed as a task rather than an opportunity. We see our 'grassroots' approach as a different kind of program review, through which departments can build community by working collectively and collaboratively. The development of a shared vision can encourage an understanding of curriculum as a shared responsibility and promote a sense of program ownership. From this perspective, program review is not only an iterative process of program renewal, but also one that encourages scholarly, reflective teaching practice. However, there are challenges that may compromise the ability of program review to produce meaningful change, not least of which is the time investment from faculty who are already taxed. Departments considering their own program review should identify strong leadership, clear goals and realistic timelines, and consider the limitations and barriers that may exist in their unique context.

3D DNA: A kinaesthetic approach to Genetics instruction

Lars Petersen; Mount Royal University

When engaging students in molecular biology, it is challenging to convey the relationship between structure and function while relying on images that range from simplified and cartoonish to hyper-detailed and amorphous. This is especially true for DNA, and even physical models fall into the trap of being simplistic matching shapes with a ribbon backbone, or accurate yet fragile molecular ball and stick models. Despite the conceptual improvement that these models offer over 2D images, student engagement with these models is limited by size, accuracy, durability, and quantity. I worked with the MRU Maker Studio to design and 3D print a better model of DNA. The model is comprised of the molecular structures for the four nitrogenous bases and the deoxyribose-phosphate backbone. Students can build nucleotides by creating "covalent" bonds between the bases and backbones and make complementary pairs by matching magnets to mimic the hydrogen-bonding between bases. Students use the same principles that guided the original modelling of DNA and gain important insight about the structure-function relationship. As "maker spaces" become more commonplace on university and college campuses, there are new opportunities to flex our creative muscles and provide an off-screen kinaesthetic experience for students in courses with highly conceptual subject matter.

The Art of Observation - What Art Can teach us about Learning Biology

Ruth Pickett Seltner,Todd Nickle; Mount Royal University

There is a growing body of evidence that suggests that students who study Arts (music and fine arts) have higher success in the sciences. Recently, the intersection of disciplines known as STEM has been promoted. However, the skills of the Arts are emerging as an important component, bringing STEAM into focus for educational researchers. Arts skills are applicable and transferable to any field in science.
This hands-on workshop will look at ways that the study of art can be incorporated into the biology curriculum. Using a proper arts vocabulary (for example, in terms of colour, composition, and form) fosters better observation

and communication in lab and classroom situations. In some of our classes, teaching students to describe what they see as opposed to what they should see, provides more accurate data collection. Art can be used to explore connections of disparate elements and reveal overall themes. Biology, in particular among other science disciplines, has been the inspiration for important works that have spurred deeper exploration.
We will look at the literature behind STEAM, then, as a group we will practice approaches to including artistic skills in the Biology classroom. We will share ideas that can be taken back to our own classrooms and open discussion on removing silos between traditional disciplines.

Life on the Edge: A Prototype Video Game for First Year Biology Students

Ross Shaw, Isabelle Sperano, Robert Andruchow, Brian Brookwell; MacEwan University

In 2018 we began development of a serious video game for post-secondary first year Biology Students called “Life on the Edge”. Serious games are serious due to the matter of the game rather than the attitude of the player. Generation Z (Gen Z), also known as centennials or post millennials make up the majority of University students. Gen Z actively play video games not only in their personal time but also at school, mostly from kindergarten to grade 12 (K-12). Indeed, the game environment in K-12 is extensively developed and used alongside traditional instruction methods like lecture. Once entering University, Gen Z rarely encounters the use of video games as a supplemental resource in their learning experiences. We asked the question: Why do University Students not have access to, and use serious games as a major educational supplement? This question was intriguing, and with research realised that few serious games have been developed for post-secondary education. In addition, most of the games developed are too serious or “not fun” for people to play, so much so, that the academic field of serious games made a call in 2012 for more development of serious games that are actually fun to play. We decided to tackle this challenge by developing a tower defense game in which players struggle to keep a cell alive. Development, design, and playing of the prototype will be presented.