

Teaching Philosophy – Anchors of my Teaching:

I think it was the Turkey dance that did it – an embarrassing moment that started my journey into teaching pedagogy and process. I primarily teach Human Physiology – courses that are typically jammed full of facts and processes. I had been teaching muscle mechanics (a real page-turner!) and could see from the glazed faces that the point wasn't hitting home. In desperation, I described dark and white meat on a turkey and how those muscle fibres differed. I could see them perking up, and in my excitement, I acted out the use of these fibres in what my students now affectionately call the Turkey dance. Yes, I looked ridiculous - but they got the point! Now that dance is a yearly tradition (although shorter so students can't record it on their phones!!).

This experience, and others, have taught me things that I now anchor my teaching with to create experiences that best support student learning. The **anchors of my teaching philosophy** are:

- 1) **You have to let the students see you for who you are.** Students respond to personal stories, so I often use personal experiences in my lectures to engage the students. These include stories about my research and graduate school that hopefully get them thinking beyond their degrees. While they may not relate to my husband and labour stories yet (in our reproductive unit), they do find them funny and memorable! I also give them lots of “Mom” advice that keeps them amused (and hopefully not smoking)! Being on-line, the Mom advice includes self-care suggestions (take a break, play outside, have a treat!). And sometimes you just have to dance!
- 2) **Engage! Engage!** – I know if I'm enthusiastic about the material, then they are too! I ask lots of questions to keep them with me and to check that they're all understanding the material as we go. I have to be ready to modify the lecture for questions or new concepts and to teach where they're at. I use lots of examples to reinforce points, as well as pictures. There's nothing like a picture of a hemorrhoid to help them remember that little condition!
- 3) **Everyone needs a little break:** If it's been a heavy lecture, I like to throw in a “distraction” so that they can catch their breath– a funny story, a disease, a quick video, an animal comparison, or some new research. This helps them to stay engaged.
- 4) **You can do a lot to minimize student stress.** A sense of humour in the classroom can lighten up a lecture (especially when you have an 8:00 am lecture!). My course can be overwhelming, but some encouraging words and a clear outline of what they need to know can go a long way in keeping them on track. I give them unit study guides with questions, as well as unit to-do lists. I add in “funny freebie” questions to exams – this helps them relax during the exam.
- 5) **Everybody's different!** I like to present concepts in different ways to reinforce for different learners. This includes using flow charts, visuals, case studies, examples, review games and questions, reference sheets, and extra tutorial sessions on tough topics. It's also important to assess students in different ways so my senior courses include a wide array of test questions (short and long answer) to benefit every learner. The extra marking is worth it.
- 6) **Sometimes you have to fake it 'til you make it.** Not every topic I teach is as exciting as muscle mechanics and fibre types! Sometimes it's a lecture on DNA transcription. I know if I come in excited and throw in a few fun facts and diseases, the students respond and I find myself actually excited to teach the topic!
- 7) **Keep learning and evolving!** I can still improve my lectures and my courses. I know I talk fast and can get on a roll, but I try to keep assessing the audience. I'm always tweaking. I hope my students gain more than knowledge of the body in my class. I hope they leave with questions – not because I didn't teach them well, but because I taught them to think and apply their knowledge to other problems and questions.

Teaching Strategies:

One of the challenges I have for my subject area is the sheer volume of material to be covered. I am always fighting the inner urge to vomit all the facts and knowledge at the students. In many cases, less is more. I want to balance the lectures and the knowledge delivery with interactive learning. I have to find the line where the students are getting enough information from me to be able to expand their knowledge base on their own. After 25+ years of teaching, I am still fine-tuning this line. I know I have to lecture in a traditional style to cover the material, but my goal is to develop materials that would help the students retain the information (beyond their exam!). My memberships with several teaching societies in my field (including American Physiology society, National Association of Biology Teachers, and University Biology Educator of Alberta - UBEA) have helped me develop my courses and my teaching. I'm also active in the Human Anatomy and Physiology Society (HAPS), which focusses on teaching. Through conferences, workshops, and research papers, I've been able to further develop my materials.

Lessons Learned:

For several years, I was teaching Anatomy and Physiology at two very different institutions. My University of Calgary courses were very large (200-500 students each term) while my courses at the other institution were very small (20-35 students). The course material was the same, but I had assumed that the smaller class size (that allowed for more discussion and interactive learning) would benefit the students at the smaller institution and it would be reflected in their grades. Curious about this- I decided to quantify it over a three-year period. I had students write a course pre-quiz which showed that both groups were starting at the same knowledge level. Through some Faculty development workshops I had taken at U of C, I had developed some inquiry-based materials that I had incorporated into both courses. In each of the terms, I delivered the same course material, used the same case studies and lab exercises, and used the same review materials and lab reports (I like to think that this was for science and research, rather than it being easier to do the same thing for everyone!). I gave the students in both classes identical test questions and found that the scores for each group had no significant differences. It was clear that class size did not influence student outcomes. I surveyed the students to determine what they found to be the most beneficial to their success in the course. Overwhelmingly, the students confirmed that it was the case studies and the interactive learning experiences that they found most to be the most helpful, the most interesting, and most memorable. I was able to present this work at several Physiology teaching conferences (HAPS, Experimental Biology) where discussions with colleagues on their teaching experiences further cemented the view that interactive learning was essential to better student success.

Once I reached these conclusions, I started to make a concentrated effort to incorporate more of this type of inquiry-based learning into my teaching. The challenge was to do this with very large classes sizes. How do you get 500 students excited about a case study? The challenge became even greater this past year, with on-line teaching due to COVID. How do you encourage interactive learning when there's no face-to-face interaction? This was particularly difficult with the lab portion of the courses. It was my Turkey Dance moment all over again, but sometimes desperation gives you inspiration and I was able to come up with some unique ways to keep the students engaged. These innovations are things I will continue to do when we go back to more traditional learning because the student feedback was so positive. My teaching is not perfect and it can't always "get the job done" for every students, so the more resources I can provide to the students, the better their chances of connecting with the material!

Evolving Teaching

In addition to my lectures, student experiences in my courses now include:

1) Surgery Demonstration

Through my research lab, I have been able to provide a unique animal surgery experience to my students that is a highlight of the cardiovascular unit. Students come to my lab for an animal surgical demonstration that shows the students physiological principles in a real way. The demo is done with several smaller groups and the students have an opportunity to touch a live beating heart. I've seen the difference in student understanding between student who've attended the demonstration and those who haven't. It's a rare opportunity for the students to see a live large-animal surgery in a time when lab experiences are being reduced in many courses. It's an opportunity to educate students on animal research and to have some consider graduate school and research in their future.

2) Case studies

To help develop critical thinking skills and to help them apply their knowledge, I've written several case studies (and use many written by others as well). The ones that I have authored usually include diagnosing patients – where they have to take their knowledge of a body system and decipher the information to determine where a system is failing. They have to be able to recognize how a disease state can affect many body systems – by seeing the symptoms (body effects) and back-tracking to find the cause. Each lab report the students complete include patient diagnoses, with positive feedback.

With on-line teaching, I added some Weekly Diagnosis Challenges as a bit of a game for students to engage with (as well as providing extra practice!).

3) Supplementary Activities

This year, with the on-line format, I had to get a bit more creative to keep the students engaged and excited about the course. I started posting some extra activities and “tidbits” that included:

- a) **Disease of the Week** – I did some extra short videos to supplement the course material – Examples included parasitic worms, scurvy, diabetes, and super-bugs. The reinforced the course material well. For example, Scurvy (a lack of vitamin C) can be deadly by weakening collagen cross-links and affecting connective tissue – so I posted this for the unit on Body Tissues. We added patient diagnosis challenges as well.
- b) **Party Games** – I gave the students lab exercises that they could do at home. For example, in the sensory unit – I gave them exercises on touch, temperature, vision tests, and hearing tests. For the respiratory unit, I gave them activities like breath hold times and hyperventilation. In face-to-face learning, I had always suggested these exercises as something they could do with friends. In COVID – it became an ironic name that stuck and I provided hand-outs for them. For the aging unit, they got interview questions for their parents and grandparents to answer.
- c) **Physiology fun facts** – Weird little facts that gave them a laugh...advertised as something to make them the life of the party (when there were no parties allowed!). For example – did you know why standing in water makes you need the bathroom?
- d) **Humble Humans** – I started incorporating some animal comparisons into extra short videos. There are many ways in which animals systems are better than humans. Insects have 9 colour cones and can see into the ultra-violet spectrum. Frogs can breath

through their skin. Students found these to be entertaining and a nice break from the lecture material.

- e) **Supplementary Videos** – These included weekly lists of optional videos on the course material. For reproduction, it included a “Seinfeld” clip about boxers vs. briefs. For our unit on Space physiology, they watched several videos made by Chris Hadfield. Others were more serious and included Ted Talks, or documentaries. I was happily surprised at the number of students who watched them.
- f) **Trivia Challenges** - they would get some weekly questions with the answers posted the next day. They included “Name that Disease” and “What Body Part?” Some were close-up micrograph pictures and they had to guess the tissue. These became pretty competitive within some of the discussion groups they had formed on D2L.

4) Discussion groups

These began as scheduled tutorial times with the TA’s – where they had exercises and case studies to work through as groups. Over time, I began to add in some extra sessions with me outside of class time. We called them “Coffee, Tea, and Me”. It had originally started casually with small groups of students in my office - but they grew to sessions of ~30-40 students (pre-Covid). Some sessions were to review difficult concepts in the course, but others have specific topics outside the course. Some examples are “Is Medicine for me?”, “Is Graduate School for me?”, “How do I get into Physiotherapy?” “How can I improve my Multiple Choice skills?”, “Gross Pics and stories”, and “Mom Advice!”.

5) Extra tutorial sessions for harder concepts

As I said above, these sessions are taught by me rather than the TA’s – which gives me more opportunity for student interaction. The most popular one is on cardiac cycle – which is done “old school” on the whiteboards. The students find they get it when I draw the diagrams out as we go through the process step by step. I typically do 3 cardiac tutorials and have more than half the students attend (~150 students).

6) Supplementary Materials

Over several iterations of the courses, it became clear to me that the students wanted and needed more review materials. Now, for each unit in the course, the students are provided with review sheets (with questions they need to answer and definitions they need to complete), reference tables to complete, as well as multiple choice reviews.

For their exams, they get study guides – with mark break-downs, numbers to know, diseases to know, as well as a list of material they can ignore. The course has a huge volume of material and this helps them to focus their studying and reduce test anxiety. These are important to ensure that the students are clear on course expectations.

- 7) **Interactive review games** – team reviews with a fun slant. Interactive review sessions are fun and help with retention. Student feedback on these sessions include “it helped me focus on what material was important” and “it showed me what areas I still needed to study”. I’ve developed the questions for these games and have incorporated these into the tutorial sessions for the Knes 323 course and have the TA’s run them. They include:

- a. **Physiology cranium**

- I wrote these to highlight the study topics and to bring out some of the harder concepts. It includes charades, Pictionary, trivia, diagram draws, summary charts – all done in a

fun type of competition. We do these before the midterm and the final exam in a tutorial format- and the competition can be fierce (but fun!).

b. Physiology Trivial Pursuit

Tell a student you have flashcards and they're not that excited. Combine them with a modified board game and suddenly they all want to play. I have students borrowing the games every weekend. Through the term, I probably have 100+ students taking advantage of this review game. I also provide the flash cards in an on-line format that has worked well.

c. The Bean Game / Jeopardy / Snakes and Ladders

These are modified multiple choice reviews (right minus wrong format). The students like them because they can practice some tough multiple choice questions and feel more confident going into the exam. Again, combining with a board game format like Snakes and Ladders made it something they all wanted to do. Jeopardy is also a fun way to review – it's an interactive game I designed for the computer. These were very easy to modify for the on-line format.

8) Integration of Lectures, Labs, and Tutorials

Laboratory exercises are hands-on activities. They test their own blood, their own urine, their own cardiac or pulmonary or muscle function. They relate to it better and this makes them far more interested in the exercises. It's important that the lab and lecture material are tightly integrated so they can apply the lecture knowledge, so I'm careful with lecture and lab timing. Similarly, the tutorials and case studies we do are closely related to course material for application.

The lab exercises use data acquisition systems. I was able to take a 3-day course from the company that enabled me to write up the lab exercises within this program. It is more interactive for the students to use and allowed me to specialize the lab activities to exactly what I wanted for the course.

With the on-line format this year, I made a series of lab videos, demonstrating the lab procedures, and provided the students with data sets for them to analyze at home. I also developed at-home lab activities for them to complete.

One thing I'm doing more conscientiously now is to be more inclusive. When I name the patients in our case studies or diagnosis exercises, I use names from a variety of ethnicities. It's a small thing, but I've had students comment that they appreciate seeing their backgrounds represented. We've incorporated "themes" into the patient names as well. Last year, we used names from different sports – and then awarded a bonus point if the students could identify them. It got quite competitive and became a fun way to engage. Students were sending in theme suggestions too.

To ensure that students are not overwhelmed (by the volume of lecture material AND by the volume of resources), most of these activities and "extras" are optional for the students to take advantage of. I am very encouraged by the number of students that do indeed use them. I did a survey of the class last term (and last year when we were still face-to-face) and found that in both years – the percentage of students who found these resources useful and who took advantage of some or all of them was well over 98%. Feedback from the students indicate that these activities help them connect the dots and integrate the knowledge. Many of the extras I added during on-line delivery will definitely be kept in the face-to face format going forward.