Motivating Students by Facilitating and Modeling Agency

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A world citizen with a global mindset is someone who you want to be around. Someone is interesting and friendly because they are interested. By creating a fun and supportive environment where students feel free to express themselves and are taught to find and follow their interests, one can foster intrinsic motivation for creativity and learning. This behavior needs to be modeled in an ongoing manner over time. My physics students arrive in my class in Grade 9, and a large group of them remain with me until they graduate in Grade 12. I have a pretty big opportunity to influence them in those years.

> Growing up with a global perspective is really a lifelong process and not one final destination—you don't just arrive—qualities of humility, curiosity, and compassion will be nurtured. These are the virtues of a true friend and a world citizen. (Tavangar, 2009, p. xvii).

Agency lies at the center of creativity, and is synonymous with motivation, but is not simply freedom; agency requires the skills to do something with freedom, to take action creatively with an interesting or useful outcome, to spiral towards creation that one can be proud of, and that attracts you to it. Agency is a new framework to see the world in ways that one did not see it before. A useful framework. A framework that one wants to share. Agency is the ability to construct a new context, to share it, so it overlaps with the context of others. Bauböck (2006) suggests that the earliest conceptions of democracy and citizenship require the agency of the participants, both the freedom to choose and the capability to choose responsibly.

How can one develop students' intrinsic motivation for learning with a global mindset and then assess that development? By providing the tools that students need to actualize their interests, and sharing possible interesting choices for actualization as a spark, one develops the

intrinsic motivation of a student; also, a teacher needs to be interested, creative, funny, knowledgeable and excited, because motivation is contagious. Global citizens, with a global mindset, must be interested and motivated and this behavior can be modeled. To respect diversity, to seek out others in the world, and try to understand the other instead of rejecting or retreating or fearing, one must inquire and find things to inquire into.

I try to model exciting and inquisitive behavior in every lesson. I provide agency to my students to pursue information in their own context, and I make it interesting beyond the text. I know my subject well, and I enjoy it, so I have the agency to do this, to share that context, to share that joy. How do I assess that I am achieving the outcomes that I desire? I make observations. I question, and I get the learners to ask questions. Then, I ask the learners to act and create something which can be assessed.

I love physics, and I love seeing it all around me in the world. When I open the door to my house, most often, it is very hot inside, and my students are in the same situation in their homes. I see a beautiful swirl of invisible high energy particles buzzing around the room, bouncing off the walls. I fling open the big double French doors to my porch and I imagine many of these high energy particles making their way outside, as I release the pressure in the room, the particles start exchanging energy with those outside, seeking equilibrium, the house particles are smashing into the porch particles, which at this point is a bit cooler as it is later in the day. I explain this to my students, walking about the room, bouncing off the wall like a particle. I compare the gas particles in a hot room to a bunch of punk rockers slam dancing. I show them videos of punk rockers slam dancing, the culture of my youth, a subculture of my birth country in the 1980s and 1990s a hot, chaotic gas, colliding, exchanging energy. Then as the gas in the room cools, the collisions become less, now more like a square dance, or a Lao style dance

where arms interlock and unlock, like a liquid, the particles lock arms from time to time then unlock. I have my students stand-up and pretend they are particles, we talk about what happens when particles can give away their energy, they start to cool, as they cool they become less individualistic, less punk, they finally start to line up in neat rows and vibrate in place in a more organized manner arm in arm, like soldiers in formation, the particles now are a solid. The students interlock arms and bounce up and down bending their knees, we are all having a laugh. "This is the table, people. It is the walls of this room, that is what they are doing."

This is how I engage my students, I talk about what I love, I can see their eyes light up, the smiles appear on their faces because suddenly the students are seeing what I am seeing, they are thinking about physics the way they should, they are feeling creative. I pull out a spring. I attach a mass to the end, and I start it oscillating.

"This is what the atoms in the table are doing…they are oscillating back and forth like this spring. Everything is a spring."

We are going to study springs. The most interesting and useful unit in all of physics is the unit that is presented in the most boring way in text. F=kx, the spring formula, graph F vs. x, and the slope is k.

I have given the unit a personal context to me and provided an opportunity for my students to incorporate this into their own context, and we have a shared context we can all relate to. Everyone will think of springs and thermodynamics when they get home and open the door to their hothouses. They are engaged, they are motivated, and they are ready to be creative. I can immediately assess this as they are smiling, their eyes are wide, they begin asking questions, and sharing the insights they are having.

“So, you're saying Mr. Mike, everything in this table is moving, we just can’t see it?” I light some incense. “Look at the smoke, you can see the collisions, that is why the smoke moves in all these random directions.”

Then I toss them the ball. According to Dighe (2000) educators must “ensure that in each case, quality education which is meaningful/relevant to each learner” is occurring, so students develop the capabilities required for a diverse and just world (Dighe, 2000, p. 2)

“I want you to write down for tomorrow 3 things you see in the world that relate to the kinetic theory of particles in your everyday life. Just send them to me in an email, and I want you to ask three questions about this theory. A concept you do not understand, or a problem from the textbook, which when you checked your answers, still did not make sense.”

On the table are bags of springs with varying stiffness (signified by k in the equation F=kx from above), some clamps, some 100-gram masses and mass hangers which can be attached to the springs, some posts, stopwatches, meter sticks, duct tape, measuring tape, some nails, metal rods, rulers, putty, scissors and string.

“I want you to break into small groups and explore the relationship between F=kx where F is the force or the weight in Newtons that can be attached to a spring with a constant k, k is essentially the ‘stretchiness’ of the spring, and x is how far it stretches. You need to use our standard lab template. I want each group to write up your plans for how you will be exploring this relationship. You can all see that F=kx is the equation of a line, so I want to see some linear graphs in your final deliverable. In addition to the standard lab work, I want a presentation on how this spring relates to your personal experiences in the world. Go as far with it as you like. Explore metaphor, or just think about the physics around you. You can present in any way you wish, a video, a dance, a painting, an essay a speech, I don’t care. Have at it. Scaffold each other,

and if you can't understand something after inquiring a bit, come ask me, that is what I am here for. If you want any materials not on the table, let me know and I will find them, or something similar. I am watching and assessing you, so contribute and work together."

The scenario above is an example of cultivating intrinsic motivation, creativity, and facilitating an environment that potentially differentiates for learning style and capabilities while modeling an inquiry mindset needed for learning with a global mindset. With regards to assessment, they are occurring every minute as I register my students' interests, respond to their questions, ask my own, and eventually observe their interactions in the laboratory culminating the final lab reports and presentations. This classroom is based on agency and creativity as the students are inspired to solve problems in their own way and present their solution in their own way with very little constraint, simply a loose framework as they must include a purpose, theory, apparatus, procedure, data, evaluation of data, and conclusions from the lab framework. They can fill in those boxes however they wish, though in the case above, I wanted the inclusion of a linear graph. I know this graph will end up being weight vs. spring length, and the slope will be k, the stretchiness. My students will discover that. Most will have the idea quickly from the textbook, but I never specify it, only ask for a graph. I put the stopwatches in a pile for those that want to extend and see how the period of oscillation can be affected by k or weight. I may get some graphs of period vs. mass or period vs. k.

Despite being a physics course, during their presentations, they will share their cultures or daily life, or thoughts about particles and springs and my punk rock model set the stage for a bunch of interesting presentations. Students will collaborate, interact with one another, share their stories, and relate physics to their real lives. They are developing the agency the world

needs. McGavin (2017) discusses the difference between “self-determined and socially determined identity,” I am facilitating a self-determined identity of being a confident inquirer.

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