Fostering Innovation

Michael Andreas

University of the People

Fostering Innovation

One of the fantastic things about physics as a subject is that in trying to understand the nature of the physical universe, one is really just developing completely generalizable capabilities to solve problems, the content of physics is not the important part, it is the process of exploring and discovering the content. I made a career in solving problems around the globe that had little directly to do with physics, but my physics training was essential in developing this capability. Coming up with a new solution is innovation. Utilizing the innovations of others, though, is just as important, and often, this existing 'best practice' can be applied in new ways. My goal as physics teacher is to utilize the content of the curriculum as a context and environment, to facilitate the development of my students' affective and cognitive capabilities, effectively providing learners with the tools, confidence, self-efficacy, motivation, and ultimately agency to *flexibly innovate* for their own purposes, and in any milieu; I have a goal for every student becoming an innovative leader capable of, and motivated to, improving the planet with matching high-expectations complimenting their capability.

To foster globally capable, creative, and flexible innovators, one should utilize the proven innovations of others that align with this goal. The reason I emphasize flexibility is that I have found flexibility as a key component of successful global collaboration and engagement. One must have a flexibility in one's cognitive frameworks, and approaches to solving problems, to be truly innovative, not just in one's native environment, but any environment; a spirit, or motivation for inquiry is important as well, one must enquire into others first before one can have the opportunity to synthesize and reflect upon their differences. Flexibility and choice go hand in hand. Choice and inquiry are also coupled.

Agency requires capability and self-efficacy, which are intertwined with parents', community members', students,' and educators' expectations first (Hoover-Dempsey, Walker, Sandler, Whetsel, Green, Wilkins, & Closson, 2005). The numerous evidence-based studies supporting the innovation in thought linking the importance of expectations on development, regardless of apparent existent capability known as, the 'Pygmalion Effect,' has had a huge influence on my teaching and my own personal paradigms; the study's results forced me to reevaluate many of my pre-existing concepts, teaching me so much more than just the importance of expectations on learning (Rosenthal, & Jacobson, 1968; Ellison, 2015). When I began to apply raised expectations with my students, I immediately saw measurable positive results. Students who I had pigeonholed as having some sort of disability, one that I was not qualified to diagnose, seemed limited in their possible achievable outcomes in my classroom. I underestimated the non-verbal ques that betrayed my lowered expectations, such as eye-contact, quantity, and quality of interactions, seemingly harmless comments, or misplaced humor. I actively changed my behaviors and expectations as an experiment and was shocked at the quick results. Engagement, test scores, homework quality, collaboration with other students, and even students' perceptions of one-another improved. I applied this same new and innovative paradigm to the parents of my students, to my family, to my friends and colleagues, and I watched as others began to rise to higher expectations. This innovation really emphasized to me the importance also, of metacognition, and getting my students to 'think about their own thinking,' as well as others. I began to actively inform students and parents about the pedagogical tools supported by research that was going to occur in my classroom so all parties could think about their learning as well. By engaging in reflection on one's personal motivations, and those of others, the groundwork for the facilitation of a just, multicultural and innovative global

capability is laid. A global critical consciousness has a foundation in "analytical introspection, continuous reconstruction of knowledge and the recurring transformation of beliefs and skills that are essential elements of self-reflection" (Gay & Kirkland, 2003, p. 182).

Once expectations are raised, and the importance of reflection and metacognition is understood, then finding the tools for fostering general cognitive and affective capabilities along with the flexibility, and motivation for inquiry are next on the list. These traits are required for engaging in a global perspective and facilitating student agency. Yet, these capabilities cannot be at the expense of mastering the specific course content required for the high-stakes examinations that would assist my students with their aspirations for international education and are a priority of the school administration, parents, and students. To achieve this dual-task, I looked for evidence-based innovations of others that applied to my goal of facilitating an agency for crafting innovations, with a humanistic foundation that I feel is required for a just, globalized perspective. I sought a philosophical underpinning based on a growth mindset that emphasizes agency and metacognition in the affective and cognitive realms.

I have found that Maslow's Hierarchy of Needs is a good model for facilitating a growth mindset in the affective realm; I seek to facilitate a pedagogy and an environment that emphasizes meeting my students' basic physical and safety needs while providing a supportive environment that cultivates belonging and the esteem required for the emotional agency represented by self-actualization (McLeod, 2017). Collaborative learning techniques in a consciously respectful environment that involves explicitly acknowledging, affirming, and accommodating for my students' variations in gender, culture, ethnicity, linguistic background, class, capability, learning style, motivation, and personal paradigms is one way to foster the

inclusiveness required of self-actualization and model the behavior I want the student's to also engage in with one another (Asia Society & OECD, 2018).

Finally, the cognitive capability must be developed, along with the acquisition of the specific curricular content in the IGCSE and AS and A-Level physics curriculum to facilitate the functional capabilities of my students for future agency and self-efficacy. According to evidence-based research differentiated pedagogical models that emphasize student choice, authentic, collaborative, project-based learning (PBL), and are consciously designed to maximize on students' strengths and preferences such as Universal Design for Learning (UDL) frameworks, need to be put into practice (CAST, 2018; Kaput, 2018). At the core of these models, "leadership is distributive, collaborative, and participatory, and the central task is identifying and nurturing innovation" (Reimers, 2009). My classroom emphasizes many collaborative projects where students explore the physical relationships and curricular concepts in their own way, and I have had success with this model. My job is to scaffold student inquiries, ensure the items in the syllabus are *discovered*, and foster inclusivity; the learners do the rest.

Instructors, students, and parents must collectively raise their expectations for each other and for the world in a way that leadership is the expectation for all, and a society of self-motivated innovators is more beneficial than one consisting of employers leveraging others' innovations for their own personal benefit; a just, environmentally sound, and peaceful global world-order depends on it.

References

Asia Society & OECD. (2018). *Teaching for Global Competence in a Rapidly Changing World*,

    Asia Society, New York, Retrieved from https://doi.org/10.1787/9789264289024-en

CAST. (2018). Universal Design for Learning Guidelines version 2.2. Retrieved from

    http://udlguidelines.cast.org

Ellison, K. (2015). Being honest about the Pygmalion Effect. Retrieved from

    http://discovermagazine.com/2015/dec/14-great-expectations

Gay, G., & Kirkland, K. (2003). Developing cultural critical consciousness and self-reflection in

    preservice teacher education. *Theory into Practice,* 42(3), 181-187. Retrieved from

    http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.460.7961&rep=rep1&type=pdf

Guo, Y. (2006). Why Didn't They Show Up? Rethinking ESL Parent Involvement in K-12

    Education. *TESL Canada Journal,* 24(1), 80 - 95. doi:

    https://doi.org/10.18806/tesl.v24i1.29

Hoover-Dempsey, K., Walker, J., Sandler, H., Whetsel, D., Green, C., Wilkins, A., & Closson, K.

    (2005). Why Do Parents Become Involved? Research Findings and Implications. *The

    Elementary School Journal*, 106(2), 105-130. doi: 10.1086/499194. JSTOR, JSTOR

    www.jstor.org/stable/10.1086/499194

Kaput, K. (2018). Evidence for Student-Centered Learning. Education Evolving [Pdf] Retrieved

    from https://www.educationevolving.org/files/Evidence-for-Student-Centered-

    Learning.pdf

Reimers, F., M. (2009). Leading for Global Competency. *Teaching for the 21st Century,* 67(1).

    Retrieved from http://www.ascd.org/publications/educational-

    leadership/sept09/vol67/num01/Leading-for-Global-Competency.aspx

Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom. *The Urban Review*, 3(1), 16–

      20. Retrieved from https://doi.org/10.1007/BF02322211