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Presentation: Becoming a STEM teacher: Is it possible? How?

Abstract: The growing emphasis on STEM and Inquiry-Based Learning (IBL) initiatives and their impact on students' learning and their engagement in the science classroom is informed by research evidence and has been well documented. However, despite a growing consensus regarding the value of inquiry-based teaching and learning and STEM, the implementation of such practices continues to be a challenge. If science teachers are to use inquiry-based science education and implement STEM in their classrooms to develop students' inquiry practices and encourage them to think as scientists and STEM career, a better understanding of factors and settings that can influence their attitudes towards STEM and Inquiry-Based Learning (IBL) is very much needed. This understanding can inform planning and practices at different levels or settings at schools.

The local culture of the students including peers, family, industries, career models, and the use of technology in everyday life can induce students' interests in studying science and understanding STEM and take career in STEM. Therefore, to promote STEM education at schools and IBL, it is important to take advantage of their local culture and raise awareness of the applications of STEM through science lessons. This STEM school culture required collaboration among stakeholders and building a collaborative and supportive STEM community in school.

In my lecture, I argue that there is a need for adopting a different perspective for teacher continuing professional development CPD in a STEM discipline. A perspective of CPD that promotes and understands teacher development as a learning activity Not a training activity. In addition, I will argue that helping a science or Math teacher to be a STEM teacher needs to consider blending the boundaries of the four different-disciplines including Science, Technology Engineering and Mathematics to produce a STEM discipline. Finally, I will argue that the current traditional top-down approach in Saudi Arabia whereby the CPD programmes are introduced to teachers regardless of their needs will not work to make an effective STEM-CPD.

Finally, I will argue that there is a need for STEM-CPD partnerships that can provide opportunities for professional scientists, mathematicians and engineers to work with primary and secondary students and teachers through establishing different models of partnerships between schools and STEM professionals and experts. This notion of the partnership allows partnering with a local university or a nearby school, attending professional development, having common teacher planning time, and encouraging open communication with the STEM local communities. This could lead to developing a STEM partnership-based professional development model of what teachers need in terms of content knowledge and pedagogical content knowledge to enact STEM education in class.

Workshop: Learning together and sharing experiences to integrate STEM in the science and math classrooms

Abstract: This is a self-reflective and interactive workshop about practical ideas to integrate STEM in Math and science classrooms. Because there are no quick and simple solutions, no single programme or packaged intervention to train teachers to integrate STEM in the classrooms, the issue of reflection and sharing ideas becomes critically important. This will allow us develop practical ideas that can work in a context like Saudi Arabia schools and classrooms. Any attempt to generate “tricks of the trade” must be avoided because of the complexity of the issue of STEM integration in the classroom and because of the individual needs, motivations, experiences, and abilities of children but also the skills that teachers might have and do not have to be able to teach one discipline like science or math. The challenges that teachers might have and that we want to tackle in the workshop is how can we deal with STEM in the classroom as a STEM discipline and not multi-individual-disciplines like science, Technology, Engendering and Mathematics?

Unlike many of the existing STEM teacher training practices which are based on a “kit-approach” to incorporating STEM, this workshop STEM teacher training workshop do not use kit materials of any sorts. Teachers are introduced to STEM education via developing critical thinking skills, sharing experiences, and undertaking problem and project-based STEM investigations via an inquiry-based approach. This workshop will be highly interactive and participants will be actively engaged throughout the entire workshop

So in this workshop, we will try to achieve the followings:

- Identify briefly our understanding of the STEM as a one discipline.
- Introduce some practical ideas to use STEM in the classroom hands on experiences in the workshop to run STEM activities.
- Sharing the participants’ ideas and experiences about successful cases of integrating STEM in their classroom. In this regard, I will encourage all teachers taking participating in the this workshop to bring with them materials, cases, activities, lesson plans , etc they want to share with the other participants.