

Special Issue Editorial: Significance of STEM Education in Teaching and Learning for the Changing World with COVID19

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We have great pleasure in releasing this special edition on “*Significance of STEM Education in Teaching and Learning for the Changing World with COVID19*”, which focused on the importance of STEM education during these challenging COVID 19 scenarios. Integrated approaches to teaching and learning, and teacher preparation are key aspects to be focused on to nurture a responsible generation that is motivated and proficient in STEM. This would open new avenues for changing the existing practices and might lead to innovations that would have an influence on contemporary lifestyle practices. These are unknown, unpredictable and uncertain times, requiring unprecedented experimentations with new choices to reverse or enhance established practices. It is certainly tough to deal with many difficulties in daily life, let alone in research, teaching and learning settings. We must confront these times with resilience to face the challenges and find alternative routes to forward. This would most likely include a timeline from inception to conclusion of current practices and a roadmap for future practices.

Knowledge must be targeted as a powerful knowledge that leads to innovations in changing current practices for a new world. Knowledge should be treated not only as discipline knowledge, fundamental knowledge, and conceptual knowledge, but also as an integrated interdisciplinary knowledge that could be used for innovation and practice improvement. When coherent interdisciplinary integrated knowledge is finely focused, it will be like a laser for action. That will allow the powerful knowledge to emerge. This powerful knowledge laser travels faster than light and has the potential to sharpen current practices for going forward.

Despite limits of COVID 19 and lockdown in many parts of the world, there are some noteworthy contributions in this special edition showing innovative research and viewpoints that could lead to changes in existing practices. They may not be lasers of powerful knowledge, but they would produce substantial concepts

in creating conditions for innovation using lasers of powerful knowledge.

Stretch and Roehrig meticulously developed components of launching creativity from uncertainties and failures. Serendipity, mistakes, and observations can foster credible innovations and changes when it is used with creative, intelligent, and critical reflections on the process and procedures. They also debated whether creativity should be included as an essential component of skills to be developed in STEM education. The proposed Intersection of Failure and Creativity Framework (IFCF) represents an improved way to engage students in integrated STEM activities that call for engineering design to find answers to real world problems.

Tully and Anderson described the success story of incorporating integrated STEM instruction into an online platform for secondary students. Whether online or in person, learning how to adapt and change for effective and successful outcomes leads to substantial changes in aptitude for innovations in STEM subjects. This might be the key to changing current practices.

Billones, Aquino Jr., Pusta, & Victolero-Tupas provided an effective curriculum design for mental health and eventual recovery from health psychological perspectives. The proposed Integrative Behavioral Health (IBH) model was developed based on an evidence-based research and findings. The proposed model provides an effective mental health response to post pandemic recovery in Philippines.

Burns, Labeur, and Andronicos effectively offered a fresh perspective to teaching online on an online extremely highly practical skilled biology undergraduate program. This worked as a catalyst for more favorable models and practice in subsequent programs integrating real skill settings.

Dewsbury and Mermin explored the scenario of students’ perception of institutional responses to COVID19-driven distribution in their learning experience. The importance of social connection and a sense of belongingness in learning engagement is emphasized. This would provide insight into cognitive exposure in

Manuscript received June 4, 2021; revised June 25, 2021.

engagement of learning and teaching, whether online or in person.

Sultana, Kahwaji, and Kurup highlighted the importance of English language proficiency among ESL learners in STEM education, as well as a fundamental grasp of interdisciplinary integrated knowledge. The significance of pedagogical principles involved in English language competency building is critical to ESL learners' effective participation in STEM education. The gap in English language competency needs special attention among ESL learners to build interdisciplinary integrated STEM conceptual understanding.

Overall, this edition is limited with six articles; however, they cover with a wide spectrum of challenges,

changes and competencies built during this complex scenario of COVID 19. They aligned with the idea of building a laser of powerful knowledge, that would lead to further advancements in these areas. Ms. Haylee Lin's editing and administrative work was flawless, and this would not have been possible without her help. We also thank the reviewers for their contributions, which helped shape the articles' final acceptable version.

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