World Academy of Science, Engineering and Technology
International Journal of Educational and Pedagogical Sciences
Vol:17, No:11, 2023

Mathematics as the Foundation for the STEM Disciplines: Different Pedagogical Strategies Addressed

Authors : Marion G. Ben-Jacob, David Wang

Abstract : There is a mathematics requirement for entry level college and university students, especially those who plan to study STEM (Science, Technology, Engineering and Mathematics). Most of them take College Algebra, and to continue their studies, they need to succeed in this course. Different pedagogical strategies are employed to promote the success of our students. There is, of course, the Traditional Method of teaching- lecture, examples, problems for students to solve. The Emporium Model, another pedagogical approach, replaces traditional lectures with a learning resource center model featuring interactive software and on-demand personalized assistance. This presentation will compare these two methods of pedagogy and the study done with its results on this comparison. Math is the foundation for science, technology, and engineering. Its work is generally used in STEM to find patterns in data. These patterns can be used to test relationships, draw general conclusions about data, and model the real world. In STEM, solutions to problems are analyzed, reasoned, and interpreted using math abilities in a assortment of real-world scenarios. This presentation will examine specific examples of how math is used in the different STEM disciplines. Math becomes practical in science when it is used to model natural and artificial experiments to identify a problem and develop a solution for it. As we analyze data, we are using math to find the statistical correlation between the cause of an effect. Scientists who use math include the following: data scientists, scientists, biologists and geologists. Without math, most technology would not be possible. Math is the basis of binary, and without programming, you just have the hardware. Addition, subtraction, multiplication, and division is also used in almost every program written. Mathematical algorithms are inherent in software as well. Mechanical engineers analyze scientific data to design robots by applying math and using the software. Electrical engineers use math to help design and test electrical equipment. They also use math when creating computer simulations and designing new products. Chemical engineers often use mathematics in the lab. Advanced computer software is used to aid in their research and production processes to model theoretical synthesis techniques and properties of chemical compounds. Mathematics mastery is crucial for success in the STEM disciplines. Pedagogical research on formative strategies and necessary topics to be covered are essential.

Keywords : emporium model, mathematics, pedagogy, STEM
Conference Title : ICTES 2023 : International Conference on Teaching and Education Sciences
Conference Location : Dubai, United Arab Emirates
Conference Dates : November 13-14, 2023

Open Science Index, Educational and Pedagogical Sciences Vol:17, No:11, 2023 publications.waset.org/abstracts/169792.pdf