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## RESEARCH ARTICLE

### PROMOTING HIGH-QUALITY STEM EDUCATION.

**Dr. Annie Kavitha, L.**

Assistant Professor of Mathematics, Meston College of Education, Chennai-14.

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#### Abstract

STEM is a potentially new educational powerhouse, and when applied properly, this curriculum integrating process can make a big difference in how our future leaders see the world, and solve problems. It is an exciting paradigm for giving children the tools to compete in the highly competitive global economy. According to National Science Foundation, "In the 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalization and a knowledge-based economy. To succeed in this new information-based and highly technological society, students need to develop their capabilities in STEM to levels much beyond what was considered acceptable in the past." STEM education creates critical thinkers, increases science literacy, and enables the next generation of innovators. Innovation leads to new products and processes that sustain our economy. This innovation and science literacy depends on a solid knowledge base in the STEM areas. It is clear that most jobs of the future will require a basic understanding of math and science.

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#### Introduction:-

STEM stands for Science, Technology, Engineering, and Mathematics. STEM is important because it pervades every part of our lives. Science is everywhere in the world around us. Technology is continuously expanding into every aspect of our lives. Engineering is the basic designs of roads and bridges, but also tackles the challenges of changing global weather and environmentally-friendly changes to our home. Mathematics is in every occupation, every activity we do in our lives. STEM is a curriculum based on the idea of educating students in four specific disciplines in an interdisciplinary and applied approach. Rather than teach the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications.

#### Stem and Education:-

Today's students are tomorrow's leaders. Occupations in STEM-related careers are some of the fastest growing and best paid of the 21st century, and they often have the greatest potential for job growth. As America strives to keep up with the current and projected demand for STEM output, it is important that our country remains competitive in fields of science, technology, medicine, and all of the other STEM fields. The best way to ensure future success and longevity it is to make sure that students are well versed in these subjects. Building a solid STEM foundation through a well-rounded curriculum is the best way to ensure that students are exposed to math, science, and

**Corresponding Author:- Dr. Annie Kavitha, L.**

Address:- Assistant Professor of Mathematics, Meston College of Education, Chennai-14.

technology throughout their educational career. Students are extremely curious and impressionable, so instilling an interest at an early age could spark a lasting desire to pursue a career in any of these fields. By the time a student is ready to enter the work force, they must have enough knowledge to make invaluable contributions to our nation's STEM industries. It is also important that schools have an ample amount of teachers who are experts in STEM, and these subjects should always be considered as high demand subjects.

### **Requisites of Stem in Education:-**

STEM is of the utmost importance because of the role these subjects play at multiple levels of society, and the tremendous impact they have. Our country's entire economy revolves around mathematics, accounting, economics, functions and logarithms, and calculus. The architecture industry is centered on math, as is urban development and city planning. Medical research is fuelled by the study of chemistry and biology, and environmental efforts like sustainable energy and nuclear power are also steeped in the sciences. It's impossible to find a part of society that does not, in some way, interact with these subjects, and since so many of these industries are coordinated by or connected to our government at some level, it's safe to say that the very governing of our country depends on them. STEM is essential to our education system, as school districts across the country strive to build a stronger curriculum around these subjects.

### **Stem Skills:-**

STEM skills are defined as those skills "expected to be held by people with a tertiary-education level degree in the subjects of Science, Technology, Engineering and Mathematics" (STEM). These skills include "numeracy and the ability to generate, understand and analyze empirical data including critical analysis; an understanding of scientific and mathematical principles; the ability to apply a systematic and critical assessment of complex problems with an emphasis on solving them and applying the theoretical knowledge of the subject to practical problems; the ability to communicate scientific issues to stakeholders and others; ingenuity, logical reasoning and practical intelligence. STEM skills are needed for navigating the modern world and competing in the 21st century job market.

### **Essential Stem Teaching Practices for Teachers:-**

- **Believe in students** - Set high expectations for students, challenge them to succeed, and believe that they will. Most students will perform at the level of expectation, so trust them to make informed choices about their engineering challenges, come up with creative solutions, complete complex tasks, and work together smoothly to do so.
- **Transfer control of the learning process to the students** - Develop new roles and rules that stress student responsibility. Then guide from the sidelines while keeping students on target with their direction and purpose. Aims at helping them become self-sufficient learners.
- **Foster curiosity**-Learn the art of asking open-ended questions with plenty of possible answers. Pose problems rather than answers and send students on a search for solutions. Use discrepant events to intrigue students and draw them into the problem. So that students engage in using critical thinking skills to solve problems.
- **Provide hands-on, experiential learning**- Learning through reflection and doing is compelling. When students have their imagination piqued, give them opportunities to actually investigate multiple possible solutions to a problem, or to solve a mystery. Providing materials that team of students can explore and manipulate.
- **Increase collaboration among students** -Get comfortable with teamwork. Actively teach teamwork skills and work with students to heighten awareness of their team behaviors and ways of interacting in the class.
- **Accept failure**- It is a necessary part of learning and growing. That is, accept failure that accompanies taking a risk and experimenting, knowing that they might not get it right. Everyone in the classroom should feel safe in taking risks. We learn more from what we do wrong than from what we do right, and engineers learn from their mistakes. In fact, failure is a necessary part of learning.
- **Be an inspiring leader and role model for students** - Be positive and enthusiastic about what students are learning and how they are learning it. Be passionate in teaching and love of subject area.
- **Accept some drawbacks**-STEM education will improve student engagement, critical thinking skills, and workforce skills. But it may also play havoc with the lesson plan and make it more difficult to cover content benchmarks in a stepwise process. In the STEM classroom, flexible and ready to make some quick shifts in thinking are necessary. It may also need to be willing to deviate from lesson plan, depending on the direction the students' investigations and decisions take them.

- **Evolve and grow as a learner** - One of the most important things can do, as a STEM teacher, is to pay attention to the art of teaching. Develop skills in facilitating so that students focus on learning how to think like engineers. Embrace digital tools and technology in the classroom with help from students.
- **Learn in community** - Work with colleagues to study effective ways of teaching STEM lessons.

### **Impact of STEM in Education:-**

“STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy.” (Tsupros, 2009). STEM is imperative, because it pervades every aspect of our lives. High quality STEM experiences develop critical thinking skills, increase science literacy, and enable the next generation of innovators. By increasing student’s science attitude, identity, and engagement, we can have a positive and lasting impact on the student. High quality, well-facilitated STEM activities encourage students to be curious, ask questions, and make connections with the world around them; essential skills for success in life and in our global economy.

### **Conclusion:-**

By exposing students to STEM and giving them opportunities to explore STEM-related concepts, they will develop a passion for it and hopefully pursue a job in a STEM field. A curriculum that is STEM-based has real-life situations to help the student learn. Programs like Engineering for students integrates multiple classes to provide opportunities to see how concepts relate to life in order to hopefully spark a passion for a future career in a STEM field. STEM activities provide hands-on and minds-on lessons for the student. Making math and science both fun and interesting helps the student to do much more than just learn. All young people should be prepared to think deeply and to think well so that they have the chance to become the innovators, educators, researchers, and leaders who can solve the most pressing challenges facing our nation and our world, both today and tomorrow. But, right now, not enough of our youth have access to quality STEM learning opportunities and too few students see these disciplines as springboards for their careers.

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