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Issues and Challenges in Implementation of STEM Education in the Present Scenario

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Abstract
STEM education refers to developing abilities in science, technology, engineering, and mathematics. It has become important in modern society since, in the future ten years, 80% of employment will require some level of science and math proficiency. Despite having exceptional talent, India's exam-focused educational approach has traditionally prevented its pupils from developing their creative, problem-solving, managerial, and social abilities. The most significant contributor to people's social mobility in India is thought to be education, particularly in the field of STEM education. In addition, science and technology have long been the foundation of education because they are seen as the means of bringing about development. There are several obstacles that come along with every transformation. It is accurate for STEM education implementation in India. After that, let's discuss the various difficulties India is having implementing STEM education. Infrastructure, and the resources required to build it, is one of the biggest challenges facing STEM education. It's a fantastic program for a nation's progress. India, the second-most populous nation on earth, nevertheless has a long way to go in terms of STEM education. To provide its future generations with the advantages of STEM education, the political, social, and economic spheres of society must work closely together. India faces many significant obstacles when it comes to offering high-quality STEM education, including the provision of adequate infrastructure, financial resources, appropriate instructional equipment, skilled teachers, and scientific developments. In order to provide high-quality STEM education, India faces a number of significant issues that must be handled at the national level. These include the provision of strong infrastructure, financial resources, appropriate instructional equipment, well-qualified teachers, and breakthroughs in the scientific area.

Keywords: Issue, Challenges, STEM

Introduction

STEM education-encompassing Science, Technology, Engineering, and Mathematics-plays a critical role in shaping the future workforce and driving innovation. However, despite its importance, STEM education faces numerous challenges in the present era. These include lack of student engagement, insufficient teacher training, unequal access to resources, outdated curricula, and persistent gender and racial disparities. To overcome these obstacles, a comprehensive and inclusive approach must be adopted by educators, institutions, policymakers, and communities.

Infrastructure and the associated expenses of creating additional infrastructure are two huge challenges for STEM education. The corporate sector must work with the educational sector primarily for this reason. Over the years, the price of conducting high-quality research has undoubtedly skyrocketed. Furthermore, cutting edge facilities are necessary for cutting edge developments. In the United States, a large number of private organizations create great expenditures to children' education beginning in elementary school. The largest privately sponsored education programme in the United States is run by the Howard Hughes Medical Institute (HHMI), making it the most prestigious. From elementary schools to graduate institutions and beyond, the programme assists students. Other examples of private programmes to aid students in their scientific endeavours include the Burroughs Welcome Fund (BWF) and Intel education STEM resources.

To make the Indian government's slogan "Sabka Saath Sabka Vikas" (Together with all, Development for all) a reality, training opportunities and research participation should be made available to all parts of society, including minorities, the

impoverished, and the economically disadvantaged classes. Minoritized groups in the U.S. have the chance to learn about research thanks to the Higher Achievement programme, which also organizes numerous trips to the research labs of participating universities.

Education in STEM also entails having qualified instructors who are knowledgeable about the most recent advancements in their professions. A well-trained cadre of teachers will be required to guide the upcoming generation of pupils in India, a country that typically elevates gurus to lofty pedestals. For India's policymakers, the White House's proposal to establish a real teacher organization of roughly 10,000 STEM educators could provide some guidance.

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STEM is a fantastic programme for a nation's progress. India, the second-most populour nation on earth, nevertheless has a long way to go in terms of STEM education. To provide its coming generations with the advantages of STEM education, the political, social, and economic spheres of society must work closely together.

Issues & Challenges in Stem Education

India faces many significant obstacles when it comes to offering high-quality STEM education, including the provision of adequate infrastructure, financial resources, appropriate instructional equipment, skilled teachers, and scientific developments. Today is the lack of student interest and engagement. Many students perceive STEM subjects as difficult or irrelevant to their lives. To address this, educators must make learning more engaging and relatable. Integrating real-world problems, hands-on experiments, robotics, coding, and project-based learning can make STEM more exciting and meaningful. Furthermore, linking STEM topics to everyday life, environmental issues, or future careers helps students understand the practical value of what they're learning.

Another critical challenge is the shortage of well-trained STEM teachers. Many educators lack up-to-date knowledge or confidence to teach complex STEM concepts effectively. Professional development programs, continuous learning opportunities, and collaboration among teachers can help bridge this gap. Schools and governments should invest in training that equips teachers with modern tools and teaching strategies, especially in areas like computational thinking, artificial intelligence, and data science.

Access to quality resources and technology remains uneven, especially in rural or underfunded schools. This digital divide prevents many students from experiencing modern STEM education. To solve this, equitable distribution of digital tools, internet access, and lab facilities is essential. Public-private partnerships can play a key role here, by funding infrastructure and donating equipment to schools in need. Additionally, open-source platforms and online learning resources can help make STEM education more accessible.

Social and Economic Challenges

India is a developing nation, and the vast majority of its citizens suffer tough social and economic conditions. Under such scenarios, it becomes challenging for education systems to develop STEM solutions that the broad majority of the people can use. Gender and racial disparities are persistent issues in STEM fields. Girls and students from underrepresented backgrounds often face stereotypes, lack of role models, and limited support. To address this, schools must foster inclusive learning environments, promote diverse role models, and encourage participation through mentorship programs, clubs, and scholarships. Representation matters, and celebrating diversity in STEM can inspire more students to pursue these careers.

Finally, fostering a growth mind-set is crucial in helping students overcome fear and anxiety around STEM subjects. Teachers and parents should emphasize effort over innate ability, create safe spaces for learning through trial and error, and encourage curiosity and persistence.

Infrastructure Challenges

Due to a lack of infrastructure and the false perception that STEM laboratories are expensive, many schools do not use STEM labs. Additionally, there are not enough STEM-trained educators.

You have access to a variety of inexpensive STEM activities that are simple to use in the curricula and don't need a high-tech lab.

Technological and Scientific Challenges

If our institutions become centres of technical and scientific advancement, this plan will succeed. The pupils' school years are the ideal time to discover their talent.

Consequently, it is crucial to train the trainer. The teachers should have the tools necessary to identify students with an aptitude for creativity and to encourage that talent through interventions in STEM that are specifically designed for such students. Consequently, a curriculum that is one size fits all will not be successful. STEM is a fantastic programme for a nation's progress. India, the second-most populous nation on earth, nevertheless has a long way to go in terms of STEM education. To provide its younger generations with the advantages of STEM education, the political, social, and economic spheres of society must work closely together.

In order to provide quality STEM education, India faces a number of significant issues that need to be addressed at the national level, including the provision of decent infrastructure, financial resources, appropriate instructional technology, skilled teachers, and scientific advancements.

Teaching students to be engaged can be quite difficult. It can be extremely challenging to keep students' attention for an extended period of time due to the widespread usage of smartphones and other technological devices, widespread beliefs that STEM courses are difficult and inaccessible, and dull learning materials. Making sure that a desire for scientific research and discovery is nurtured at a young age is one preventative strategy for dealing with this problem. Early educators can incorporate STEM teachings into daily curricula, assisting kids in developing a fundamental knowledge of and interest about their surroundings.

The majority of instructors and educators have an erratic and intense schedule, which frequently leaves little time for them to create complex and interesting STEM lessons. Here's where technology can help. According to the EPI, teachers who require technology use for class assignments in all or most of their sessions have four to five more hours available each week than those who only sometimes assign quizzes and instructive movies. A variety of challenges may arise when implementing integrated STEM education in Baluchistan. First and foremost, it's essential to have teaching staff members who have the requisite skills and knowledge, who can design experiments and activities and handle problems

that arise while integrating STEM training. This position will be filled by the most capable, dedicated, and qualified educators. Professors for all these teachers for these topics should be engaged, deployed, and kept (National Science Board,2007).

The opposition of teachers is another challenge in successfully adopting STEM education. The capacity to teach STEM courses in tandem and the ability to use more innovative teaching practises that combine both individual and group work. Teachers with these instructional skills not only help students understand STEM better, but also prepare them to use it in the future. In order to implement STEM education successfully,

Some fundamental resources, like classrooms with enough space and structure for STEM instruction, well-equipped labs, audio and visual aids, and particularly technology-related aids. For activities and storage, STEM fields demand space, said Stohlmann all infrastructure, as well as a variety of equipment and materials such computers, tablets, digital, and robotic kits, wood, glue, and other tools like hammers, calculators, and screws. These resources are crucial for effectively implementing integrated STEM education. Also, lacking well-motivated pupils for STEM education and various activities to keep them interested and involved is one of the greatest hurdles to implementing STEM education. According to Dare *et al*. (2018), while students are motivated and excited during integrated STEM sessions, it is exceedingly challenging for teachers to maintain this enthusiasm for a prolonged period of time. Additionally, Ejiwale (2013) and Meyrick (2011) strongly advocated for the promotion of more hands-on and other inspirational activities for students in order to prepare them for applying what they learn in the classroom to real-world situations.

In some ways, what students learn and, ultimately, what they study, are under their control. A student who chooses to major in STEM surely has some professors to thank for that decision, as the lecturers they have over the years can occasionally have an effect on what they end up studying. According to some data, teacher council or in-class training may even have a direct impact on a student's decision to pursue a STEM-related field of study. Additionally, despite the fact that many teachers try to connect with their students, this doesn't always work. As a result, they might need to overcome their own challenges in order to guide kids toward STEM jobs.

Effectively Combining Key Features

As we've already mentioned, one strategy is to emphasize to students the importance of STEM fields from a young age. Teachers can achieve this by incorporating science and other STEM subjects into as many of their lessons as possible. Although it might appear that early childhood educators would be in charge of this responsibility, all educators might start by instructing students in fundamental STEM concepts and progressively raise the level of complexity as their students improve. Children can learn some STEM concepts through play as well. Teachers could, for instance, add STEM concepts and suggestions for problem-solving while the kids are engaged to this exercise. Additionally, educators must try to make sure that pupils understand the value of creative thinking, teamwork, and the idea that everything is possible.

Relating STEM Education to the Society of the Present
Another strategy for piqueing students' interest in STEM is to discuss contemporary scientific issues. This also applies to technological advancements, but for students it's frequently eye-opening to see how fresh breakthroughs, processes, and ideas play a vital role in the development of new inventions. To keep learning current, teachers can routinely encourage students to look for real-world issues, formulate questions, develop answers, and evaluate outcomes through practical applications. Teachers could also attempt leveraging students' love of technology to encourage digital use in the classroom. But ultimately, encouraging more children to pursue STEM careers calls for ongoing encouragement and support.

How to Overcome the Challenges of Stem Education
In a rapidly evolving world, traditional syllabi and outdated curricula also hinder STEM education. Often fail to reflect current scientific advancements and technological trends. Curricula should be regularly updated to include emerging fields such as renewable energy, biotechnology, cybersecurity, and machine learning. Moreover, teaching should shift from rote memorization to inquiry-based and problem-solving approaches that encourage creativity and critical thinking.

We must focus on Lifelong learning components for students at all levels, from elementary to graduate, in order to overcome the obstacles, myths, and issues with STEM education. Targeting teachers who will go on to teach in STEM undergraduate, graduate, or faculty programmes is very important. STEM instructors need to be adequately prepared in order to fulfil the demands of a workforce that is both scientifically and technologically competent. To pique the curiosity and passion of young kids for STEM.

There are various steps that can be taken in careers. These are a few of them: coordinating community-wide fundraising events or other initiatives to improve students' math and budgeting abilities; instructing children at science summer camps or after-school programmes; encouraging students to join math and science clubs; examining technology-related pastimes among schoolchildren; assisting them in participating in science fairs; teaching them the fundamentals of computing and internet browsing; involving them in internet forums and social networking; and providing them with books and magazines on science (Setda.org, 2008). Furthermore, the government or related institutions ought to provide additional financial aid or scholarships for students who are pursuing degree or certification programs in STEM-related fields.

Conclusion
Overcoming these challenges in STEM education requires collective effort and a forward-thinking mind-set. By making STEM more inclusive, engaging, and accessible, we can empower the next generation with the skills and confidence to thrive in a technology-driven world.

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