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## Teachers' STEM Education Awareness: Promoting Multidisciplinary Approach in Teacher Education

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### ABSTRACT

In the Education System, the output of quality Education is the students; it is directly proportional to the quality of teachers. The effectiveness of instructors has a significant impact on education, and they also help students achieve a wide range of cognitive, social, and motivational emotional learning outcomes. A STEM teacher must offer a suitable learning strategy to help students understand the STEM curriculum. The teacher must explore the different interactive teaching-learning approaches to enhance academic achievement and higher-order thinking skills. A professional development program can be helpful for teachers to understand STEM Education and the methods to implement it in the classrooms. It is also a need for the acquisition of 21st-century abilities among learners.

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### Introduction:

The science and technology have directly or indirectly affected all the areas of human beings as well as Education. The 21st-century competencies of critical thinking, problem-solving, creativity, collaboration, and communication are become the necessary part of any country. Changing and renewing the curricula is the basic requirement of all countries to cope with the challenges of the current era. Teachers' view and attitude plays an important role in pedagogical decision (Timur, 2012). For both teachers and students to acquire the required knowledge, innovative teaching strategies and tactics are required (Yaki, Saat, Sathasivam, & Zulnadi, 2019). STEM education is one of the cutting-edge

approaches to teaching and learning. Teachers are the primary educators who use STEM education. (McDonald, 2016).

### **STEM Education**

The National Science Foundation (NSF) introduced the phrase "STEM Education." (Watson & Watson, 2013). STEM education, or science, technology, engineering, and mathematics, is one of the cutting-edge methods used in the educational system (Gonzalez & Kuzenzi, 2012). The multidisciplinary approach of teaching science, technology, engineering, and math complemented by 21st-century skills is known as STEM education. STEM education is crucial because it fosters the development of critical thinking, problem-solving, creative, and collaborative abilities as well as the ability to learn by doing, experiencing, and practicing. Additionally, it supports the nation's economic expansion and innovation development.

### **Teachers' STEM Education Awareness:**

Most of the studies reviewed by the researcher in term of Teachers' STEM Education awareness. It is discovered that educators have believed they don't know enough about STEM education. (Yildirim, 2016). The multidisciplinary concept, insufficient material, improper time, physical environment of classroom and students' interest and motivation are the main barriers for the successful implementation of STEM Education. It is necessary for instructors to possess strong pedagogical, integrative, and 21st-century skills expertise in addition to their knowledge of STEM education. But now teachers' opinions about STEM Education is positively changed and their interest gradually increased (Elam, Donham, & Soloman, 2012). The curriculum's incorporation of STEM education is successfully integrated through students' ability (Wang, 2012). Honey et al. (2014) state that The majority of schools and courses for STEM disciplines at all levels also have various departments and class times, and teachers are equipped to offer lessons only in one field. McMillan, McConnell, & O'Sullivan, (2016) study has reported The skill of educators, their efficacy, the fulfillment of their fundamental professional demands, career development and partnerships, and their interpersonal interactions all influence their willingness to study and engage in personal development. Observing their pupils' difficulties with mathematics inspires teachers to study, and this in turn fuels their irritation with their own methods of instruction. Teachers are motivated to pursue personal growth and become "better" educators by their sense of duty to ensure that students learn. (Appova, & Arbaugh, 2018). The educators lacked confidence, expertise, and knowledge in advancing STEM instruction (Campbell & Jobling, 2010).

## **Need & Importance of Teachers' STEM Education Awareness**

For scientific and technological professionals to contribute to socially and environmentally sustainable development, UNESCO contends that high-quality science and technology education is necessary (Fensham, 2008). According to Shernoff, Sinha, Bressler, & Ginsburg (2017), It's difficult to advance STEM education. There is a need of teachers or educators who can understand the concept of STEM Education and then implement these such type of innovative method and approach in classroom and motivate students to adapt these methods for their personal growth.

## **Suggestions for promoting STEM Education Awareness**

STEM Education is the demand of the society so there is a need to promote STEM Education awareness. So, there are a few approaches by which the education system can promote STEM Education awareness.

### **1. Teachers' Professional Development**

The teachers' professional development is the need for the promotion of STEM Education. Teachers should be empowered to develop skills and reinforce knowledge for STEM learning through training and courses offered by the Ministry of Education and teacher education universities and organizations. These training programs and short-term courses create enthusiasm among pre-service teachers and reduce fear of tackling the implementation process.

### **2. Development of STEM Education based Modules and instructional strategies**

The STEM Education based modules and instructional strategies addresses the challenges and need of teachers to implement the STEM Education in their classroom positively. The STEM education-based modules and instructional strategies can provide the detail description of teaching-learning sequencing that would be helpful for educators in their classroom settings. It would provide the proper guidelines for the educators.

## **Conclusion:**

STEM Education's awareness is the demand of society. STEM education's primary objective is to improve the educational content, and methodology and develop multidisciplinary thinking among learners. STEM education awareness among teachers It takes education to apply this kind of cutting-edge teaching methodology in the classroom. The successful implementation of STEM education

requires a combination of good teacher preparation, expertise in the area, and accumulation. Thus, STEM Education would be introduced in in-service teachers' training and faculty development program.

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