

TeachME Professional Development

Challenges and Supports in Implementing Integrated STEM Education

1. Integrated approaches to STEM education are designed to help the next generation of students solve real-world problems by applying concepts that cut across disciplines as well as by promoting critical thinking, collaboration, and:

- A. Adaptability
 - B. Information literacy
 - C. Creativity
 - D. Global awareness
-

2. Excellence in STEM education can impact jobs, productivity, and competitiveness in multiple sectors and fields including health, technological innovation, manufacturing, the distribution of information, political processes, and cultural change, and innovation in STEM fields drives not only economic growth, but also the quality of life.

- A. True
 - B. False
-

A Conceptual Framework for Integrated STEM

3. In order for supports of integrated STEM education to gain sufficient momentum, a conceptual framework that goes beyond a simple definition is needed and should include the rationale, goals, intended outcomes, components, and how the components interact.

- A. True
 - B. False
-

Evidence of STEM Effectiveness

4. Integrated STEM education is an evolving field, with research to date raising more questions than it answers, and according to the authors, chief among these questions is that of:

- A. Preparation
 - B. Urgency
 - C. Incentive
 - D. Feasibility
-

5. Which of the following are NOT indicated as some of the barriers that have been identified to advancing STEM education as an interdisciplinary study in K-12:

- A. Lack of connection with small group/cooperative learning and inadequate hands-on training for teachers
 - B. Poor preparation and a shortage of qualified teachers
 - C. Poor preparation/inspiration of students and lack of support from the school system
 - D. Poor content preparation, poor content delivery and methods of assessment, and poor conditions and facilities
-

Teachers' Content and Pedagogical Knowledge

6. Pedagogical knowledge plays a large role in teacher motivation and engagement, which have been found to be the most important qualities for effective teaching.

- A. True
 - B. False
-

Results

7. When teachers were asked what they perceived to be the challenges to achieving interdisciplinary STEM instruction, the most frequent responses were lack of time for integrated STEM education and insufficient resources, instructional material, and finances.

- A. True
 - B. False
-

What Supports were Needed for More Integrated Approaches to STEM?

8. School administrators believe that the ideal STEM teacher would have a passion for and solid content expertise in science and math, along with proficiency in related disciplines and a comfort level with exploring uncharted territory, trying new things, adapting, and:

- A. Being flexible with learning styles
 - B. Setting high expectations
 - C. Facilitating the students' learning process
 - D. Addressing the inevitable failure that comes with experimentation
-

Recommendations for In-Service Professional Development

9. Teachers agree that more professional development is needed in the area of STEM education, such as the opportunity to review exemplar units in key pedagogical strategies like project-based learning, to see video recordings of experienced teachers implementing integrated STEM lessons, and the ability to access quality lesson plans.

- A. True
 - B. False
-

Discussion

10. Until more teachers have greater education in disciplines outside of their teaching area, or in STEM specifically, successful STEM integration is largely dependent on:

- A. Time to research and plan for classroom adaptations that support STEM knowledge
 - B. Collaboration among teachers from multiple disciplines
 - C. Schools prioritizing STEM education along with other responsibilities such as state testing and standards-focused teaching
 - D. More time to focus on specific STEM strategies such as career, technology, and life skills
-

Implications for Policy and Decision Makers

11. The primary challenge schools face in teaching STEM subjects in an integrated way is that schools continue to teach STEM subjects separately, and schools must make structural changes that will allow students to learn the nature of each of the STEM disciplines and learn that they are interconnected in ways that will impact real world situations.

- A. True
 - B. False
-

Limitations

12. More work is needed to help teachers understand what inclusive STEM education is, as most teachers' current dispositions toward the implementation of integrated STEM can best be described as transitional.

- A. True
 - B. False
-