

# Chapter 21

## STEM and Leadership in the Future: A Path to Innovation, Sustainability, and Entrepreneurship

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### ABSTRACT

*This chapter aims to explore the role of leaders in shaping STEM education to better equip teachers with the necessary tools to instill vital STEM components into student learning. The authors argue that future leaders require a solid foundation in STEM fields and leadership qualities to promote innovation, sustainability, and entrepreneurship in a rapidly changing world. The chapter delves into how STEM education can help students develop creative, analytical, and critical thinking skills necessary for success in the workplace. The authors also emphasize the importance of leadership traits such as adaptability, teamwork, and communication in building a sustainable and creative future. In conclusion, the chapter stresses the need for educational systems to cultivate the next generation of STEM leaders who can pave the way for a prosperous and sustainable future.*

DOI: 10.4018/978-1-6684-7818-9.ch021

## **INTRODUCTION**

STEM education has grown over time, although the name “STEM” as a field of study has just recently gained popularity in the early 2000s. Since the National Science Board in the United States established the term in a research in 2001, STEM education has gained relevance in schools and institutions all over the world (National Science Board, 2001). An understanding of the important role that STEM education plays in fostering economic growth and competitiveness has grown recently, the need to provide the upcoming workforce with the skills to thrive in the changing technological environment, contributed to the emphasis on STEM education. The establishment of specialized STEM educational institutions and programs is one of the UAE’s major goals. “STEM for the Future” aims to enhance STEM education in the Emirate of Abu Dhabi, was found by the Abu Dhabi Education Council to advocate the STEM education (Abu Dhabi Education Council, 2017).

The curriculum gives students access to cutting-edge tools and resources while emphasizing the importance of practical application of STEM principles. The development of STEM careers for women is another UAE effort. The UAE has created different programs to encourage pupils to continue to get STEM jobs to increase the number of women working in STEM careers (Abu Dhabi Education Council, 2017). The UAE has made considerable investments in R&D, which have contributed in promoting innovation and creativity in the STEM fields. The Dubai Silicon Oasis Authority, for example, has constructed a research and development facility aimed at developing cutting-edge innovations in industries including renewable energy, biotechnology, and nanotechnology (Dubai Silicon Oasis Authority, 2021).

The UAE has made significant progress in improving STEM education and encouraging students to pursue studies in STEM-related sectors. The initiatives include introducing specialized STEM schools and programs, the promotion of STEM professions for women, and large investments in research and development, the UAE is positioning itself as a leader in STEM education and innovation in the Arab world as well. STEM education contributes to the long-term growth of the UAE as it adds to the students the skills and knowledge they required for the professions in a fast-changing environment.

Considering technological advancements and the growing need for a highly trained workforce, STEM education prepares students to participate in the digital economy and succeed on the job market (Al-Faris, 2017). Additionally, because the government is aware of how important entrepreneurship and innovation are for developing a robust economy, the nation places a significant focus on STEM education (Ministry of Education, 2021). STEM requires a significant type of leadership. Important elements of it include assembling experts from many fields, inspiring and motivating people, making difficult choices, and having an eye toward the future.

STEM leaders should communicate effectively, encourage teamwork, and think about the long-term results of their decisions to have an effective leadership approach. The increasing demand for Jobs in STEM fields resulted in the interest in STEM education has significantly increased in recent years. School administrators decide whether their institutions will succeed or fail. They can alter school culture to better suit the current environment’s demands (Al-Zoubi et al., 2023; Alkaabi, 2021; Zepeda et al., 2020) and guarantee that STEM continues to be at the center of the teaching and learning process. The review here of the literature attempts to show an overview of the state of research on STEM education, including the advantages of STEM education, the difficulties that STEM students experience, and the efficacy of various STEM solutions.

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