


Chapter 14

STEM and Sustainability: Shaping Future Eco-Leaders

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ABSTRACT

STEM education is uniquely important to prepare the students for success as it helps in developing several skills that are pertinent for future jobs. STEM courses especially engineering and technology enables the students to get engaged in hands-on-projects wherein they not only build a simple robot or engine but also can integrate technologies that can assist in running sustainability programs effectively. In this context, the current chapter attempts to integrate STEM subjects and sustainability in main education for the purpose of developing eco-leaders. The study in this realm states the importance of integrating sustainability topics in STEM and how the use of different technologies and innovation can help in sustaining the environment. The chapter further identifies the barriers which education institutions experience while integrating sustainability concepts in STEM education.

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INTRODUCTION

Sustainability has been shaping the future as the planet's resources are confined and need to be delicately balanced; therefore, it is vital to build a sustainable future by developing eco-friendly solutions integrating intelligent technologies. Regarding this, STEM (Science, Technology, Engineering and Mathematics) education plays a critical role in meeting the goals of sustainable future. Apparently, sustainability emphasizes on diverse global challenges such as environmental pollution, resource depletion and climate change; thus, with the help of STEM education, students can be empowered towards scientific thinking which further can enable them to overcome these challenges effectively (Ibrahim et al., 2023).

STEM Education combines various disciplines, and it also connects with diverse subjects that encourage the students to apply their knowledge innovatively. It is an integrated approach which involves students in diversified projects and practical experiences where they can come up with innovative solutions to solve real-world challenges. This thereby helps in developing skills which are crucial in 21st century. In addition to this, STEM education also sparks intelligence level, creativity and it equips the students with necessary skills that are required for STEM related careers (Khushk, Zhiying, Yi & Zengtian, 2023). For example, robotic workshops help the students to learn as well as design program robots wherein they can use engineering principles. This can assist in performing particular tasks that are critical and challenging in nature (Abdallah & Musah, 2023).

STEM education is helpful in developing technological skills and it leads to more innovations whereby energy-efficient devices as well as smart cities can be established for the betterment of sustainable future. STEM education prepares the students with necessary skills (creativity collaboration, problem solving and communication) as it integrates four different subjects into an organized approach. STEM programs and activities teach beyond science and mathematics concepts, and they help the students as well as teachers to discover real-world aspects which not only develop creativity among pupils but also it sharpens communication, productivity and literacy skills (Jamali, Ale Ebrahim & Jamali, 2023).

STEM and Sustainability is a self-paced course that is being designed for the purpose of providing educators the knowledge through which sustainability topics can be integrated into STEM curriculum. Moreover, STEM education enables the learners as well as educators to develop the competencies through which they can become competitive in their respective domains (Darmawansah, Hwang, Chen & Liang, 2023). Thus, in this realm the present study highlights the integration of sustainability in mainstream education. It defines the amalgamation of technology, science, mathematics, and engineering with sustainability concepts and how it leads in achieving sustainability goals.

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