Chapter 6
Integrating Indigenous Knowledge and STEM for Sustainability in African Science Curricula

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ABSTRACT

As education systems around the world move towards sustainability and fairness, adding Indigenous Knowledge Systems (IKS) to Science, Technology, Engineering, and Mathematics (STEM) education has become a strong way to reform/change the curriculum, especially in Africa. This chapter examines the integration of African traditional ecological practices, medicinal knowledge, agricultural systems, and

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ethical values into STEM education to foster culturally responsive and sustainability-focused learning. Utilizing case examples from Nigeria and several African nations, the chapter demonstrates effective methods for incorporating indigenous knowledge, such as the application of Zobo in biology education and traditional meteorological predictions in environmental science, into the conventional curriculum. It also lays out a strategy framework for participatory curriculum development, with a focus on localized content, indigenous languages, interdisciplinary education, and professional development for teachers.

1.0 INTRODUCTION

The climate change emergency, worldwide health disparities, biodiversity destruction, and food insecurity have forced education systems across the globe to redefine the teaching and learning processes in science and technology, focusing on sustainable development. Although STEM (Science, Technology, Engineering, and Mathematics) education is core in preparing learners to have the tools to solve these multilateral challenges, there is an increased appreciation that contemporary science is not enough (McDonald, 2016). Rising national and global challenges had raised an alarming call for a need to develop solutions that would not only solve these problems but also lead to sustainable development. To solve these problems, attention has been shifted to education as a tool for development and transformation. An educational system is valueless if it does not contribute to the development of the society where it is acquired. However, for education to be relevant, it has to resonate with the realities of the society. But it is saddening that education in Africa has been reduced to schooling and learning acquired within the four walls of a classroom or a school. Most education systems in Africa consist of theories, beliefs, worldviews, and ideologies that have little or no connection to the society. The African indigenous knowledge system that speaks volumes of our history, identity, intellectual wealth, wisdom, folklore, and traditions, among others, has been sidelined, while Western education is seen as the best form of education. No wonder we struggle and battle with challenges that were non-existent during the time of our ancestors and are unable to come up with innovations that can help solve rising challenges.

Education can successfully drive towards sustainable development when it resonates with the realities of the learner. Sustainable development is achievable when we embrace our own reality and adopt practices that are suitable and peculiar to our environment and can help solve our societal problems. Inherent in our culture are loads of technological tools, intellectual properties and practices that are sufficient to aid our development. These practices had been in place and had been sustaining the existence of Africans, so no doubt, these practices, if revived and reintroduced