

Education for Sustainable Development and STEM Education: Implications for an Interdisciplinary Approach to Mathematics Education in Zimbabwe

Million Chauraya

Introduction

In the last decade, two curriculum reform-related initiatives have been promoted internationally, and these are Science, Technology, Engineering and Mathematics (STEM) Education and Education for Sustainable Development (ESD). STEM Education has been advanced to develop students' competencies in Science, Technology, Engineering and Mathematics disciplines and capacitating them for taking up life careers in these disciplines. Through STEM Education, it is visualised that economies would benefit through the creation of a critical mass of human resources that can be drivers of scientific discoveries and technological innovations that underpin economic development. In 2015 the United Nations adopted 17 sustainable development goals (SDGs). They emphasised that education is a powerful tool and driver to help attain these SDGs by ensuring inclusive quality education and promoting life-long opportunities for all. Education for Sustainable Development (ESD) was promoted as a framework for reform in education to foster the development of sustainable life skills for students and lifestyles among citizens, thus creating a society that takes care not only of themselves but of future generations as well. Under ESD, students are expected to develop competencies that fulfil the objectives related to sustainability to address the challenges that nations face in the 21st century and beyond. In Zimbabwe, there have been reform initiatives aligned with the integration of STEM Education and ESD into the curriculum. Since 2016 the Ministry of Higher Education, Science and Technology Development has spearheaded the integration of STEM Education into the schools' curriculum, focusing mainly on Advanced Level (A-Level) science students. The competence-based curriculum introduced in schools in 2016 emphasises the development of sustainable competencies such as problem solving, creativity and innovation. The recently introduced Education 5.0 shows a significant attempt to integrate both ESD and STEM concepts in tertiary education curricula at the tertiary level. This chapter explores the theoretical motivations and major tenets of these curriculum reform initiatives using guiding frameworks of STEM Education and ESD as they relate to mathematics education. Implications of these reform initiatives for mathematics teachers' knowledge and classroom practices are examined. The chapter also critically analyses the efforts made so far in mathematics

curriculum reform in Zimbabwe to embrace STEM Education and ESD ideals, highlighting the successes and limitations of these efforts. The chapter proposes a multidisciplinary approach to mathematics teaching and assessment education if both STEM Education and ESD goals are to be realised. The chapter focuses mainly on these developments in relation to the schools' curriculum in Zimbabwe, although the ideas may apply to mathematics education at the tertiary level.