



MINISTRY OF HIGHER AND TERTIARY EDUCATION, SCIENCE AND TECHNOLOGY DEVELOPMENT



'Science is our natural world'

Professor Wilson Parawira

IN RECENT years, an educational movement that aims to introduce young students to the various subjects and aspects of Science, Technology, Engineering and Mathematics (STEM) throughout the whole world has arisen.

Framed as an educational equality initiatives that will give students the knowledge and skills they need to compete in the global marketplace, STEM may be the most indicative educational reform discourse of our time and has become one of the primary foci of educational policy, in part due to its easy linkage to a wide variety of industries such as information and communication technology, medical fields and sustainable innovations.

While STEM is now a common word, not everyone understands what it is or why we need to pursue STEM education.

This article provides an overview of STEM education and why it is important for Zimbabwe to embrace it for sustainable socio-economic transformation.

What is STEM?

It is an acronym for Science, Technology, Engineering and Mathematics. The term was introduced by Dr Judith Ramey in 2001 and has won widespread acceptance as a convenient way of referring to these academic subjects. STEM encompasses many disciplines.

The Science subjects in STEM in our school system include Biology, Chemistry, Computer science, Food science, Mathematics and Physics.

Technology subjects include Wood technology, Metalwork, Technical drawing, Building technology and so on.

We do not have engineering in our

secondary and high school curricula although the concepts of engineering are found in the Science and Mathematics subjects.

It must be emphasised that the definition of STEM and what is excluded varies from organisation to organisation since there are many ways to define it.

Theoretical framework of STEM education

Science and Mathematics have been part of our education system for generations so how is the STEM education different from the traditional education?

STEM education is a new paradigm shift that emphasises teaching Science, Technology, Engineering and Mathematics in an integrated manner, inter-disciplinary and applied approach.

Traditionally, the STEM subjects mentioned above were taught more or less separately. In contrast, STEM philosophy emphasises an integrated teaching approach that underscores the inter-relationship of Science, Technology, Engineering and Mathematics.

It integrates them into a cohesive learning paradigm based on real world applications. STEM education emphasises student exploration and problem-solving instead of rote learning where students are exposed to memorising and repetition and routine learning.

STEM-proficient students are logical thinkers and are able to answer complex questions and develop solutions for problems.

Clearly, what separates STEM from the traditional Science and Math education is the blended learning environment and showing students how



the scientific method can be applied to everyday life. It teaches students computational thinking and focuses on the real world applications of problem solving.

STEM education includes the knowledge, skills and beliefs that are collaboratively constructed at the intersection of more than one STEM subject area. Curriculum integration provides the theoretical framework for STEM education.

Integrative learning and curriculum integration theories reflect the progressive tradition of Dewey, in which subject matter is connected to real-life and made more meaningful to students through curriculum integration.

John Dewey's elegant statement, "Relate the school to life, and all studies are of necessity correlated," serves as an inspiration to educators who intuitively believe that curriculum integration produces greater learning

outcomes in school subjects.

STEM education builds upon curriculum integration theories in two perspectives. One perspective is that STEM education enables teachers to integrate correlated subjects without ignoring the unique characteristics, depth, and rigour of their main discipline.

The second perspective is in regard to the STEM education curriculum that guides the teachers in a flexible manner that enables them to teach STEM subjects in their natural contexts in contrast to disparate curricular disciplines.

STEM education requires teachers to excel in utilising natural and active exchanges of knowledge, skills, and beliefs among STEM disciplines.

STEM is, therefore, more than an acronym for Science, Technology, Engineering and Mathematics. STEM education is an integrated, interdisciplinary approach to learning that provides hands-on and relevant learning

experiences for students.

STEM teaching and learning goes beyond the mere acquisition and transfer of knowledge. STEM education emphasises the application of knowledge by encouraging students to design and complete real-life projects. This allows students to grasp how their studies will serve them well in their chosen career field and in everyday life.

It engages students and equips them with critical thinking, problem solving, creative and collaborative skills and ultimately establishes connections between the school, work place, community and the global economy.

STEM education also helps students to understand and apply Mathematics and Science content, the foundations for success in higher and tertiary education and careers.

It can be implemented from infant, primary, junior secondary, secondary, high school and higher and tertiary education levels. In other words, STEM education may be offered at almost every academic level.

STEM education in infant and primary school

With STEM education, students at this level are introduced to the basic Science, Technology, Engineering and Mathematics.

This is intended to give them a thorough grounding in STEM at an early age, hence the introduction of STEM subjects from infant school in the new curriculum developed by the Ministry of Primary and Secondary Education.

Students also become acquainted with the range of STEM-related fields and occupations.

It must be emphasised that at this stage, the focus is to stimulate students'

interest in STEM subjects. This initial step provides standard real world problem-based learning, connecting all four of the STEM subjects.

The goal is to ignite the students' interest so that they pursue the courses out of passion, not because they have to. There is also an emphasis placed on bridging in-school and out-of-school STEM learning opportunities.

Study after study has shown that children who experience STEM education early on will be best equipped in understanding STEM concepts later in their academic career. Simply put, the earlier educators integrate STEM lessons into their daily curriculum, the better there will be a chance for them to develop a stronger understanding of these skills, as well as cultivate a future interest.

STEM education at Secondary and High School level

STEM subjects become increasingly complex as students' intellectual capacity continues to grow.

At this stage, the subjects become more rigorous and challenging. Student awareness of STEM fields and occupations is still pursued, as well as the academic requirements of such fields. Student exploration of STEM related careers begins at this level, particularly for under-represented populations.

STEM Education at High School

The programme of study focuses on the application of the subjects in a challenging and rigorous manner. Courses and pathways are now available in STEM fields and occupations, as well as preparation for post-high school education and employment.

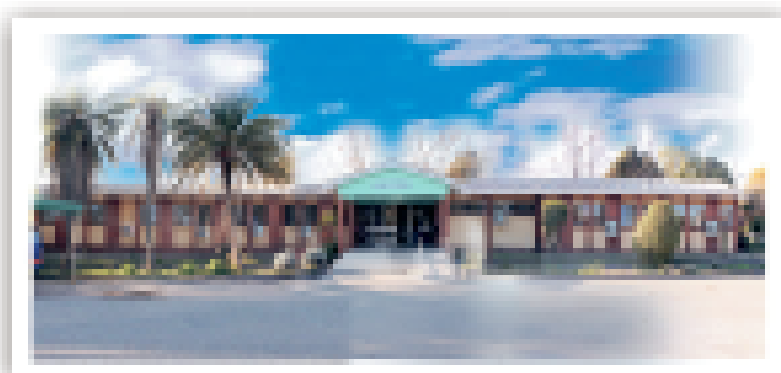
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MISSION
To provide quality education and training to all students and staff members.

VISION
To provide quality education and training to all students and staff members.

- 1. To provide quality education and training to all students and staff members from 2015 to 2020.
- 2. To provide quality education and training to all students and staff members from 2020 to 2025.
- 3. To provide quality education and training to all students and staff members from 2025 to 2030.
- 4. To provide quality education and training to all students and staff members from 2030 to 2035.
- 5. To provide quality education and training to all students and staff members from 2035 to 2040.
- 6. To provide quality education and training to all students and staff members from 2040 to 2045.
- 7. To provide quality education and training to all students and staff members from 2045 to 2050.

MISSION
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VALUES
1. Integrity
2. Honesty
3. Hard work
4. Teamwork
5. Creativity
6. Innovation
7. Responsibility
8. Respect
9. Discipline

STRATEGIC PLAN
The College has been awarded the status of a tertiary institution for the purpose of providing quality education and training to all students and staff members.

GOALS
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