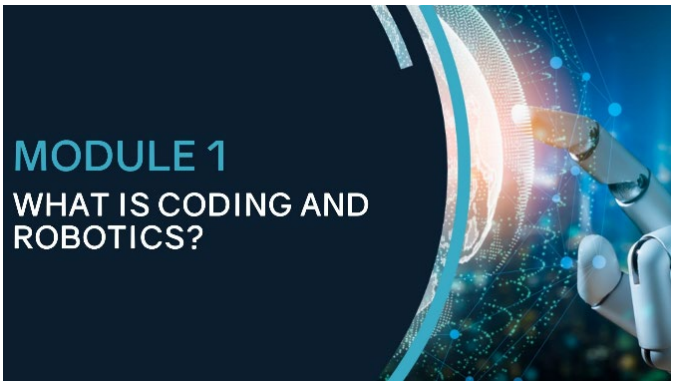
Module 1: What is Coding and Robotics?

By the end of this module, educators will demonstrate an understanding of Coding and Robotics, including their fundamental concepts, applications in STEAM education, and their relevance in the context of the Fourth Industrial Revolution (4iR)

Learning Outcomes

1. Define Coding and Robotics.
2. Explain the relevance of Coding and Robotics in the context of CAPS (Curriculum Assessment Policy Statements).
3. Discuss the integration of Coding and Robotics within STEAM (Science, Technology, Engineering, Arts, and Mathematics) education.
4. Identify the connection between Coding and Robotics and the Fourth Industrial Revolution (4iR).
5. Recognise the role of knowledge of basic electronics in Coding and Robotics.



Introduction

In this module, educators will explore the definitions of Coding and Robotics. Coding, or programming, involves creating instructions for computers and robots. It enables individuals to communicate with machines, develop software, and websites, and control hardware. Coding isn't just a skill; it fosters creativity, critical thinking, and problem-solving abilities, empowering learners to bring their ideas to life. Robotics combines engineering, electronics, and computer science, teaching students how to build and program robots. In a world where automation and AI are transforming industries, Robotics education prepares learners for the Fourth Industrial Revolution.

Coding and Robotics in the South African Curriculum (CAPS)

This chapter delves into the relevance of coding and robotics in the South African curriculum, particularly the CAPS framework. The CAPS curriculum focuses on digital literacy, computational thinking, and the Engineering Design Process. While it provides a general guideline for what should be covered, schools can start Coding and Robotics with minimal resources, even using the internet alone. Later in the course we will cover software and hardware options, even on a limited budget, and emphasise the importance of setting up a Coding and Robotics classroom.

Integration of Coding and Robotics in STEAM Education

The integration of Coding and Robotics within STEAM education is explored as a multidimensional approach that encourages holistic learning and equips students with essential 21st-century skills. Collaborative efforts among educators are necessary to successfully implement interdisciplinary learning across subjects. An example of Volcanoes is provided, highlighting how subjects like Social Sciences, Natural Sciences, Art, Mathematics, and Technology can collaborate in a Coding and Robotics project, enriching the learning experience.

Coding and Robotics in the Context of the Fourth Industrial Revolution (4IR)

This chapter discusses the connection between Coding and Robotics and the Fourth Industrial Revolution (4IR). The 4IR involves the integration of digital technologies, AI, automation, and the Internet

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of Things into our lives and industries. By introducing Coding and Robotics, educators expose learners to future opportunities related to Computer programming, Robotics, Data analysis, Cybersecurity, Artificial Intelligence, Digital literacy, and more. These skills empower learners to adapt to the ever-changing technological landscape and shape the 4IR.

Importance of Basic Electronics in Coding and Robotics.

Educators and learners are encouraged to understand basic electronics, circuits, and their principles. Simple circuits are at the core of robots, and knowledge in this area is essential. Building simple circuits and mechanical components fosters a foundation for Robotics. Educators can use various materials to demonstrate these concepts in class, encouraging hands-on learning.

Conclusion

The "Inspire: How to Get Started with Coding and Robotics" course equips educators with the knowledge and tools needed to introduce Coding and Robotics in their schools. This holistic approach emphasises the importance of these skills in the context of the Fourth Industrial Revolution and highlights their role in fostering creative, critical thinking, and problem-solving abilities among learners.

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