edhub

ROBOTICS
& CODING

RESEARCH COMPENDIUM 2021

Exploring robotics and coding in South African classrooms

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Robotics & Coding Compendium

Introduction

In recent years, the Department of Basic Education has actively explored incorporating robotics and coding into the national curriculum. In parallel to this process, with the hope of enhancing our collective understanding of integrating robotics and coding into teaching and learning practices, the NECT Edhub has collaborated with the University of Johannesburg in conducting 4 robotics and coding pilots in public school classrooms and with the pre-service teachers. Through these studies, it was possible to explore how robotics and coding may help build competencies for a changing world in learners, such as critical thinking, collaboration, creativity and communication. The exploration extended into preparing pre-service teacher with skills to integrate robotics and coding, as a tool, into their practice. This compendium is a collection of short articles sharing the emerging learnings from these pilots.

This summary offers ten key insights derived from the four case studies presented in this compendium focusing the on areas of teaching and learning robotics and coding in the classroom and the need for teacher development.

1. Effective teacher training is an essential pre-requisite to the integration of robotics and coding into schools.

2. Robotics and coding should be introduced in initial teacher development programmes to adequately prepare future teachers.

3. Extending student-teachers' preparation through coding clubs was an important mechanism to build their confidence in coding and they learnt additional skills.

4. Through coding clubs, student-teachers learnt that teaching: can be fun; it should be flexible; and that teacher demeanour is important.

5. Learners develop good attitudes towards scientific inquiry as they design and make various workable learning artifacts using robotics and coding resources.

6. Collaborative learning as a preferred pedagogical strategy when using robotics kits provides learners with an opportunity to develop and improve their communication and collaboration skills, creativity, computational thinking, and critical thinking in solving problems. Collaborative learning also promotes positive interdependence, accountability, group processing and the development of good social skills.

7. Robotics and coding can intentionally be used as a mechanism to teach subject related content and simultaneously afford learners opportunities to develop competencies for a changing world through the design of mindful engaging learning experiences.

8. Participating in coding and robotics activities stimulate positive learner sentiments with an observable increase in learner excitement, and happiness.

9. Teachers view learners in a new light as previously unobserved learning potential is revealed during robotics and coding activities.

10. Appropriate yet ergonomic resources must be made accessible to learners within schools to ensure the content is taught in the most engaging manner to stimulate not only 21st century learning, but also positive sentiments and intrinsic motivation amongst learners.

These key ideas invite debate, engagement and action by education policy makers and educational professionals, teacher training institutions as well as learners and stakeholders at all levels.