

Exploring the Effectiveness of an Online Self-Paced Coding and Robotics Course for Postgraduate Education pre-service teachers in a Higher Education Institution

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Abstract

This study examines the effectiveness of an online, self-paced Coding and Robotics course offered by a higher education institution (HEI). Employing a qualitative research approach with a constructivist paradigm to highlight the importance of implementing different strategies to enhance the learning experience. The research explores the experiences and perceptions of participants enrolled in an online Postgraduate Certificate in Education (PGCE) qualification as they navigate the online, self-paced course. The study focuses on students' motivation, challenges, and academic strategies within an online self-paced learning context, which is underpinned by the socio-cultural theory, with a focus on the Zone of Proximal Development (ZPD) and scaffolding. Through collaborative inquiry and reflective practice, participants provided insights into the effectiveness of acquiring coding and robotics principles in a fully online setting. Data were collected through semi-structured surveys and virtual focus group discussions, with a sample comprising ten pre-service teachers pursuing a Postgraduate Certificate in Education. Thematic analysis was used to examine the qualitative data and uncover key patterns and insights. The findings contribute to valuable knowledge on how to better support pre-service teachers in developing the skills and confidence needed to implement the Coding and Robotics curriculum in South African secondary school classrooms. Ultimately, the study aims to enhance the design of meaningful online learning experiences in initial teacher education programmes such as the Postgraduate Certificate in Education qualification. The study highlights the clear advantages of integrating an online robotics and coding course, such as completing the activities at your convenience, building a community of Robotics and Coding within a HEI, and equipping students with the necessary skills and knowledge to teach robotics and coding at a high school level. However, challenges like time constraints, lack of practical resources, and reduced participation should be considered.

Keywords: Coding and Robotics, self-paced, academic strategies, pre-service teachers, and collaborative inquiry