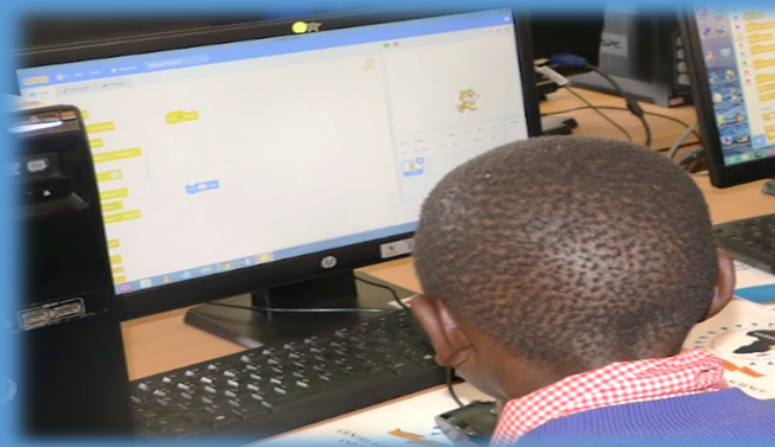




REPUBLIC OF KENYA



CEMASTE



# SITUATIONAL ANALYSIS ON TEACHING AND LEARNING CODING IN MIDDLE SCHOOLS IN KENYA

MAY 2024

## What is the issue?

The policy brief has been developed for the *'Situational Analysis on Teaching and Learning in Coding in Middle School in Kenya research study'*. The focus of the study was to address the



following research questions: Determine teachers' experiences in teaching and learning of coding in middle school; establish learners' experiences in learning about coding in middle school; Determine the challenges that schools encounter in the implementation of coding in middle school and establish existing (or required) support systems in the middle schools for effective implementation of coding education.

The objective of this policy brief is to position the research work and findings within the broader policy context, including policy strategies and decision-making processes that it will inform.

## Background information

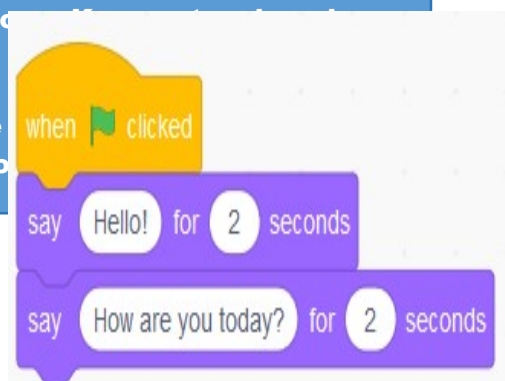
Kenya introduced Competency Based Curriculum (CBC) in 2017. Its implementation remains challenging particularly in the new content area such as coding. This curriculum thus necessitates that teachers undergo retooling and training. The Centre for Mathematics, Science and Technology Education in Africa (CEMASTEA) goal is to increase teachers' expertise in Science, Technology, Engineering, and Mathematics (STEM) education so that they can successfully develop students' STEM skills. One such key skill in STEM is coding.



### SCALE OF PROBLEM

- Kenya continues to make strides in advancing STEM education.
- Research shows gaps still exist among teachers and technology
- The research sought to investigate teaching and learning coding in Middle School

Under



## **coding education**

Coding generally refers to creating instructions that a computer-based entity (Beers, 2020). It is becoming increasingly important to give all students the chance to develop their computational thinking (CT) and computer science skills during their primary and secondary education (Cateté et al., 2018). To solve difficulties in life, one needs to be able to think computationally (Choi, Lee & Lee, 2016). One of the key elements of computational thinking, which involves logical reasoning, is coding, which is one of the 21st-century talents people need to survive in the digital age (Mohaghegh & McCauley, 2016). The ability to program computers or learn how to code has grown in popularity throughout time, and it is now seen as the "new literacy" in our quickly changing global environment. It is asserted that success in the technologically dependent world is practically impossible without knowing how to code. It helps the children to think differently and foster problem-solving capabilities (Jindal et al., 2021).

### **Key Findings from the Research**

- **Limited Pedagogical Content Knowledge in Coding Education.** 86% of the teachers had either little or no expertise in coding. Only 15 % learners indicated that they have been taught coding.
- **Professional Development.** Majority (86%) of the teachers had not received any form of training on coding.
- **Inadequate Digital Literacy.** A high number (60.7%) of teachers said they could not use digital devices to guide or instruct learners on how to code.

Policy Implications and Recommendations from the study:

- Without adequate digital skills, teachers may struggle to effectively utilize digital tools and resources to support coding education, potentially resulting in decreased levels of learner engagement and achievement.
- The lack of sufficient Pedagogical Content Knowledge (PCK) among teachers could have a detrimental impact on the successful implementation of coding education curriculum. Additionally, without a clear understanding of the content (Coding) teachers may struggle to design and implement effective instructional strategies aligned with the curriculum objectives.

Based on the policy implications, this paper proposes six recommendations to the Ministry of Education (MoE), Teacher Service Commission (TSC) and Kenya Institute of Curriculum Development (KICD)

1. Strengthen capacity development programs for teachers. TPD should be institutionalized and regularized for all teachers.
2. Implement classroom-based mentorship programs to provide ongoing support and guidance to teachers. Sensitize field officers (QASO and CSO) on coding for them to effectively support teachers.
3. Review Grade 5 coding content and simplify to the level of learners.
4. Enhance teacher capacities to effectively engage with parents, fostering collaboration and partnership in the education process in order for them to support learners with resources required to support coding education
5. Provide both physical and human resources to schools required to implement coding content

## **Conclusions**

Capacity building and strengthening teachers are crucial in successfully implementing coding content in schools. Despite the induction and training of teachers in primary and junior schools on CBC implementation, teachers still encounter challenges applying the requisite skills. These challenges are particularly pronounced in new content areas such as coding. Efforts by the

Ministry of Education, Sagas such as CEMASTEAs and the Teachers Service Commission need to be concerted and focused to address these challenges comprehensively. By providing targeted support and resources, these efforts can help teachers overcome obstacles and achieve better results in CBC implementation.

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