



**Centre for Mathematics, Science and Technology Education in Africa
(CEMASTE)**

**INCEPTION REPORT ON
PARTNERSHIP BETWEEN CEMASTE AND THE BRITISH
COUNCIL:
A TECHNICAL AND FINANCIAL PROPOSAL**

**TOPIC:
TRAIN PUBLIC PRIMARY SCHOOL TEACHERS ON
CODING**

**PREPARED BY
CEMASTE**

**SUBMITTED TO THE
BRITISH COUNCIL**

**DATE:
SEPTEMBER, 2023**

1. TECHNICAL PROPOSAL

1.1 INTRODUCTION

This inception report is for a proposed project to train public primary school teachers on coding. The project is proposed in the background of the educational reforms with priority focus on 21st century skills including digital literacy among learners. The concept is organised under: *Introduction; background; justification; project objectives; project activities; expected outcomes expected participants/ target group and training period.*

1.2 BACKGROUND

Competency-based curriculum (CBC) is a system of education where learning material is organized, taught and assessed based on performance criteria. Since independence, Kenya has changed school curricula three times: the 7-4-2-3, (1963-1984), 8-4-4 (1985-2017) and currently (2)-3-6-3-3 (2017-date). The first two systems were objective-based curricula examined using norm referenced testing while the current system is a competency based curriculum assessment using the criterion-based testing. The shift from objective based curriculum to competency-based curriculum is viewed as a relief to both teachers and students in terms of how teaching and learning is carried out mainly by way of drilling and rote learning in preparation for national examinations. Secondly, it is an improved strategy of accepting and nurturing learners' potentials in a variety of fields in addition to academics. CBC focuses on core competencies namely; communication and collaboration; critical thinking and problem solving; creativity and imagination; citizenship; digital literacy; learning to learn; and self-efficacy.

Learners are exposed to a variety of content and learning experiences that enable them to develop these competencies. One of the content areas that aim at developing digital literacy among learners is coding. Coding is introduced at grade 4 where learners are exposed to learning experiences that include use of digital devices. Coding is a new content area to the majority of teachers teaching grade 4 hence the need to train and provide school level support.

1.3 JUSTIFICATION

Countries the world over recognize the importance of coding skills and majority are implementing curricular changes that include coding as part of the curriculum (Wu et al., 2020). Kenya's education system has in recent years undergone significant reforms. With the shift to the Competency Based Curriculum (CBC), coding is one of the learning areas that was introduced into the curriculum. To establish the status on the teaching of coding, CEMASTEIA in 2022 conducted a research titled: *Situational Analysis of Teaching and Learning Coding in Middle School in Kenya*. The research revealed that most teachers lack digital literacy skills and are not familiar with the content of coding.

Moreover, most teachers had not been trained on coding with some noting that the coding content is abstract and requires time to comprehend. Learners in the majority of times require individual attention posing a challenge in overcrowded classes.

The situation is not all lost. CEMASTEIA has over 25 members of staff who have been trained on the basics of coding. The Centre has also trained 282 Primary County Trainers on basic skills on coding.

CEMASTEА boasts of a nationwide presence with INSET centers and STEM model schools that could be used training venues or coordination centres for the programme.

The world is currently in transition from the 4th to the 5th industrial revolutions which are technology driven. The implications are that soon, the majority of services will be delivered through man technology interactions. In order to prepare citizens for such a world, digital literacy skills such as coding, computational thinking and programming are essential. Skills on how to code are vital for learners because they support them to learn how to think in a structured way, to reflect on their thinking (metacognition) and learn how to learn together. Learning coding helps learners become better at logical thinking, imagination, and creativity and problem-solving. This is also referred to as smart thinking.

The new SDG4 Scorecard by GEM report and UNESCO start shows that 1 in 3 countries saw learning levels and training of teachers worsen at the pre-primary and primary levels. Whereas most teachers at Kenyan primary school level have basic skills in digital literacy, a recent study revealed that the majority lack skills in coding (CEMASTEА, 2022). This state of affairs could be attributed to the fact that coding is a recent inclusion to the curriculum, thus has not been part of the regular ICT training programmes.

Lack of skills on how to code has led to teachers avoiding teaching the learning area. This has disadvantaged the pioneers of CBC in Junior Secondary school and the current learners in grades 4 and 5 respectively. Training teachers at primary school level on how to code is therefore vital to equip them with the requisite competencies and inculcate confidence to teach the learning area. This will afford learners the opportunity to reap the inherent benefits of computational thinking and coding.

1.4 PROJECT OBJECTIVES

The overall goal of the project is to develop teacher training, coaching and mentorship processes and resources to improve delivery of coding in grades 4 and 5 with the supporting objectives outlined as follows:

1. Enhance pedagogical content knowledge of the teachers in coding
2. Promote inclusivity in learning coding
3. Enhance learners' foundational skills in coding
4. Enhance knowledge for pedagogical leaders to support teachers in implementing coding
5. Strengthen communities of practice among teachers for sustainability

1.5 PROJECT ACTIVITIES

In-turn and in order to attain the project objectives, the following activities are proposed:

1. Identify and extend an invitation to organizations involved in the design of coding content to join the project steering committee that will be led by CEMASTEА and coordinated with support from the British Council's EDU team.
2. Map out teachers and pedagogical leaders within the target areas to be included in each stage of the product design (MVP co-design, product testing/pilot and the rollout)
3. Create the Minimum Viable Product (MVP) - training content, testing tools and testing methodology

4. Review the e-Learning Platform design and content to incorporate its use by pedagogical leaders
5. Create guides and templates for the Communities of Practice (CoPs)
6. Collect user feedback on the MVP and incorporate it into the next product design to be used in the roll out stage
7. Implement the rollout and evaluate the different stages of the training
8. Create and disseminate a report on the project

1.6 EXPECTED OUTCOMES

The expected outcomes upon completion of the training are as follows;

1. Improved teaching of coding
2. Enhanced coding skills among learners
3. Sustainable communities of practice in coding

1.7 EXPECTED PARTICIPANTS/ TARGET GROUP

The target group will be primary school teachers from five selected hard-to-reach counties. The program will work with 170 pedagogical leaders (CSOs and school leaders) and 370 (600) science and technology teachers from the counties. Special attention will be given to SNE schools and female teachers.

1.8 PROJECT PERIOD

The project period will entail the following schedule:

- 1.) MVP and product / pilot test: Sept – Nov 2023.
 - a. 15-20 science and technology teachers
 - b. 15-20 school leaders / CSOs
 - c. 40-50 science and technology teachers
 - d. 40-50 SL/CSOs
 - e.
- 2.) Roll out: Jan – Mar 2023
 - a. 300 (600) science and technology teachers
 - b. 100 SL/CSOs

1.9 METHODOLOGY

Three (3) main strategies have been identified to ensure that a project is implemented effectively and is sustainable. *(The strategies have been elaborated further in the project concept note)*

1. Iterative Approach
2. User-centered Design
3. Holistic Teacher Learning

2.0 CAPABILITY STATEMENT

CEMASTEA's mandate is training and research and brings to the project long term experience in developing competencies in STEM education with participants drawn from Kenya and other African countries. The Centre's programs have transformed competencies in STEM education for effective curriculum delivery and improved quality of education. The ICT integration programs is well structured and annually the Centre has experience in building competencies in digital literacy with both local and international out reach. The Centre hosts annual coding boot camps for learners of various ages, including trainings on the use of the Arduino & TETRIX invention prototyping kit & development of Makerspace.

3.0 PROJECT TEAM

The project team will entail the following officers

S/NO.	NAME	DESIGNATION/ ROLE IN THE PROJECT
1.	Jacinta L. Akatsa	CEO, CEMASTEIA / Project manager
2.	Patrick Kogolla	Deputy Director, Training / Deputy project manager
3.	Mary W. Sichangi	Head of Partnerships & Linkages / Project administrator
4.	George Kiruja	Coordinator, Primary Program / Project technical coordinator
5.	Kizito Makoba	Science Facilitator
6.	Philip Maate	Science Facilitator
7.	Dr. Mercy Macharia	Science Facilitator
8.	Thuo Karanja	Science Facilitator
9.	Njeri Mburu	Science Facilitator
10.	Clotilda Nyongesa	Mathematics facilitator
11.	Nancy Nui	Mathematics facilitator
12.	Martin Mungai	Mathematics facilitator
13.	Agnes Mwangi	Mathematics facilitator
14.	Rahab Chiira	Mathematics facilitator
15.	Winnie Chepkirui	Training support
16.	Ben Mwangi	Budget and training support
17.	Brenda Kimweli	Training support
18.	Ann mumbi	Communications Officer / Training support
19.	Dan Orero	Communications Officer / training support

NOTE:

- Team of 10 Facilitators to be distributed (2 each) in the 5 counties
- Team of support officers (1 each) to be distributed in the 5 counties
- Team of 4 project administrators to monitor and ensure compliance of programs to the agreed deliverables.

2. FINANCIAL IMPLICATION

The project budget amounts to **Kshs.12,785,300** as shown in the table below:

NO.	ACTIVITY	SUB ACTIVITIES	TOTAL COST
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			(KSHS.)
1.	Planning/ Preparation	<ul style="list-style-type: none"> Identify and extend an invitation to organizations involved in the design of coding content to join the project steering committee that will be led by CEMASTE A and coordinated with support from EDU Map out teachers and pedagogical leaders within the target areas to be included in each stage of the product design and plan for training logistics (MVP co-design, product testing/pilot and the rollout) Create the MVP - training content, testing tools, testing methodology, review and incorporate user feedback 	3,240,000
2.	Implement the rollout and evaluate the different stages of the training	<ul style="list-style-type: none"> Coding champions training in preparation for the school based coding training School Based Training on coding and peer learning & support Monitoring and support Report writing 	7,303,000
3.	Participate in an exchange or international Conference on coding	Participants get an opportunity to share experiences and document the same	1,080,000
4.	Management Fee	10% of the total cost to cater for unforeseen/ emerging expenses	1,162,300
GRAND TOTAL			12,785,300