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Language Barriers and Their Impact on Parental Guidance in STEM Practical Assignments for Grade Six Learners in Matungu Sub-County, Kenya

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Abstract
The purpose of this article is to examine language barriers and their influence on parental guidance in STEM practical assignments for Grade Six learners in Matungu Sub-County in Kenya**.** The Government of Kenya, with an intention to enable learners to acquire competencies that are relevant in solving global problems, introduced Competency-Based Education (CBE). The framework advocates for hands-on activities and allows learners to progress at their own pace. The CBE framework is essential in the acquisition of practical skills in Science, Technology, Engineering and Mathematics (STEM). Grade 6 learners are taught theory and practical areas in STEM. This study critically analysed the impact of language barriers on parental involvement in the execution of STEM practical tasks in Matungu Sub-county, Kakamega County. English is used as a language of instruction from Grade 4 onwards; hence, most instructional materials are written in English. CBE advocates for the role of parental involvement in facilitating the teaching and learning of the STEM learning area. Language barriers pose a great challenge. The study utilised a mixed-methods approach by combining survey questionnaires for quantitative data with interview guides for qualitative data collection. This study targeted grade six teachers and parents within Matungu Sub-county. Data collection was carried out using questionnaires alongside focus group discussions. The findings established that linguistic barriers are a great hindrance to the effectiveness of parental involvement in STEM practical assignments. The results provided localised evidence for policymakers to develop targeted bilingual resources and parental support frameworks, ensuring that STEM pathways remain accessible to learners in rural Kenyan contexts.

Key terms: Competency-Based Education, STEM practical, language barriers, parental guidance.

INTRODUCTION

Globally, educational systems are shifting from traditional rote-learning models, which were teacher-centred and academically oriented, towards learner-centred approaches that prioritise the development of competencies necessary for life and work in the 21st century (OECD, 2020). Similarly, according to the reports of UNESCO (2021), Competency-Based Education (CBE) is key in this era because it emphasises the integration of knowledge, skills, attitudes, and values, enabling learners to apply what they learn in real-world contexts. The shift to CBE has focused on equipping learners in the STEM area. STEM education is a teaching approach that blends Science, Technology, Engineering, and Mathematics into a unified learning system. Instead of teaching these subjects in isolation, it focuses on real-world applications and problem-solving. STEM education focuses on experience-based and multidisciplinary learning. STEM education motivates learners to learn how to work in teams, conduct experiments to understand concepts, build models and projects, solve real–life problems by using their learning and learn digital skills such as coding.

Globally, STEM education is embraced as a critical interdisciplinary framework essential for global economic growth, solving complex societal changes and innovation. STEM education is widely recognised as a means of achieving global competitiveness and addressing economic challenges, as well as environmental issues such as climate change and food insecurity (Mudaly & Chirikure, 2023). The STEM disciplines are commodified to towards meeting economic needs as embraced by governments to solve world problems (Millar,2020). STEM is globally recognised as fundamental to national development and productivity, economic competitiveness, and societal well-being. This has led to countries adapting and including it as a compulsory learning area in schools.

In Kenya, the Government of Kenya, through the Ministry of Education (MOE), facilitated the implementation of the Competency-Based Curriculum (CBC) since 2017. The reforms in education were key in nurturing empowered, engaged and ethical citizens (KICD, 2019). The reforms grouped education into three pathways: Social sciences, STEM and Arts and sports science. STEM education is a core pathway under the Competency-Based Education (CBE), which replaced the 8-4-4 system, which was exam-oriented. The shift to CBE was to provide learners with holistic education and develop skills in learners through hands-on activities.

For over three decades, Kenya has been under the 8-4-4 system of education, which was launched in January 1985 and designed to provide eight years of primary education, four years of secondary, and four years of university education. It placed emphasis on Mathematics, English, and Vocational subjects. It was examination-oriented, and mean grading has been heavily criticised among stakeholders. This promoted key transformations and reforms in the education systems (MOE, 2019). The educational reforms, led to the adoption of the Competency-Based Curriculum (CBC) in 2019, which was meant to cope with 21st-century challenges. Kenya transitioned from the 8-4-4 system to the Competency-Based Education (CBE) framework with the 2-6-3-3-3 structure. Rote learning was widely used in the 8-4-4, which emphasised theoretical learning and passing exams. The shift to Competency-Based Education focused on learners' acquisition of competencies of what a learner can do. Competency-based education is a combination of knowledge, skills, attitudes and abilities needed to perform a specific task (Voorhees, 2001). This is built on Benjamin Bloom's theory (1968) on mastery learning, which advocates that if learners have enough time and the right instruction, all can attain mastery of content, which is the role of the Competency-Based Framework (CBE). Wambui (2024) opines that CBE seeks to shift education from relying on the grading system and annual curriculum schedules to learners' mastery of the skill taught (Wambui, 2024). Several benefits are associated with CBE, including customising the support accorded to each learner, letting individual learners progress at their own pace, and prompting learners to move to another skill only after acquiring competence in the previous one (Casey, 2018). The CBE framework aims to develop an engaged, empowered and ethical citizen.

The Competency-Based Education (CBE) exposes learners to a number of learning areas such as languages, science and Technology, mathematics, creative arts and sports, religious studies and social

studies (MOE, 2015). The learning areas prepare them to specialise in three main pathways in the senior secondary, which are STEM, Social Sciences and Arts and Sports Science. This paper focuses on the learning area of STEM (Science, Technology, Engineering and Mathematics), which, on a global scale, is important for driving economic growth, fostering innovation and solving complex challenges like climate change and healthcare. It is essential in building critical thinking and the 21st–century skills necessary for an automated digital workforce. STEM is relevant in technological innovation, Workforce development, solving global challenges and economic growth and competitiveness (MOE, 2015).

STEM as a learning area is ideal because it provides an ideal experience for the learners through the hands-on activities enlisted in the curriculum designs (MOE, 2015). In the Kenyan education system, STEM in Grade 6 is handled as a compulsory learning area called Integrated Science. STEM education is important to grade six learners because it promotes the cultivation of core competencies under the CBE, such as problem-solving, critical thinking and learning to learn. STEM equips learners in Grade 6, which is critical to the study because learners transition to junior school, which prepares them to choose their career pathways, with the STEM pathway being one of them. At this level, learners are equipped with 21st-century skills such as real-world problem-solving, which enables learners to design solutions to solve real-world problems such as healthcare challenges and technical problems. The language policy in Kenya stipulates that learners are taught in English, which becomes an official language, setting a barrier in communication during lessons and undertaking assignments.

Parents are key stakeholders in the implementation of the Competency-Based Education (CBE) framework, as they become co-educators. The parents actively participate in assisting learners in tasks such as the STEM practical tasks, where they provide guidance. The parents' involvement in education is a constellation of actions that take place at home and at school, whose aim is to promote the success of students in academic, social and behavioral fields (Henderson, 2018). This is good as it enhances their participation in disseminating knowledge to learners. This study examines how language barriers in relation to English proficiency create a 'linguistic bottleneck' that prevents parents from effectively guiding their children, leading to potential academic inequality. Linguistic barriers, however, may affect this role, as many parents may lack the necessary linguistic competence to interpret the vocabulary used in the assignments. This study intends to examine how linguistic barriers can affect the role of parental involvement in assisting learners with the STEM practical assignment. This study examines how language barriers cause a disconnect between the curriculum and parental support in STEM practical assignments. This study examines how the linguistic barriers identified affect the implementation of CBE in STEM education for Grade Six learners in Matungu Sub-County.

A number of studies have examined parental involvement and challenges in CBE implementation. Saoke et al. (2025) argue that parental involvement is a key component in enhancing studies in the CBE framework. Parents play an important role in the holistic growth and development of a child and education. Parents are viewed as the first educators, trainers and source of authority. Their involvement positive development on the learners academic (KICD, 2019).

Muigai (2018) examined the participation of parents in the education process, which has largely been limited to financial contribution, attendance at parent-teacher meetings, and disciplinary support, and not active participation in learning activities. Deysolong (2023) emphasised the role parents play in children's learning, including offering academic support, giving motivational and emotional support, reinforcing responsibility and discipline, and bridging the homeschool gap. The issue of the role played by language and how it influences parental involvement in CBE learning activities remains unexplored. This study specifically focused on how language barriers hinder parental participation in STEM practicals, particularly when analysed through a structured framework like Epstein's model. The present study fills this gap by investigating the interplay between language, parental involvement, and STEM learning in the context of Competency-Based Education (CBE).

LITERATURE REVIEW

The Education system in Kenya has undergone significant transformations over the last few decades. The 8-4-4 system was launched in 1985, emphasising academic rigour and national unity. In 2017, there was a transition from 8-4-4 to the Competency-based Curriculum (CBC), which emphasised holistic and skill development (MOE, 2019). It was later changed to CBE in 2025, which points to the need to stress practical orientation towards science, technology, engineering and mathematics (STEM). According to Wambui (2024), the mode of assessment under CBC is formal in that the students are evaluated through projects, presentations, and a real-life problem-solving approach as opposed to one final examination. The major changes introduced include the introduction of parents as co-educators whose role is to assist their children in carrying out assignments while at home, providing the required materials and supervising activities. The transition to Competency-Based Education (CBE), implemented in Kenya through the Competency-Based Curriculum (CBC), places emphasis on developing learners' practical skills, critical thinking, and problem-solving abilities. Unlike traditional content-based systems, CBE prioritises hands-on learning, particularly in Science, Technology, Engineering, and Mathematics (STEM), where practical activities play a central role in competence acquisition (MOE, 2019).

In the CBE structure at the lower grades 1-6, STEM is handled as integrated science. Learners are taught using English or L1, as stipulated in the language policy by the Ministry of Education in Kenya, and for grades 4-6, English is used as a medium of instruction, which creates a barrier to effective learning. The use of English as a medium of instruction in rural schools poses a challenge, especially to learners who are fluent in their L1. As per the language policy, the teachers are expected to use English as a medium of instruction in teaching STEM learning areas, as it enhances learning and teaching to effectively take place. However, the challenge of language barriers is not excluded, as the learners in school come from diverse language backgrounds; hence, English interpretation may pose a challenge to the learners and parents handling take-home activities given to learners. In Kakamega County, there exists a gap in English proficiency between the urban areas and the rural areas, as in the case of Matungu Sub-County, in which the study was conducted; hence, it creates a barrier to learning.

In Kenya, the participation of parents in the education process has largely been limited to financial contribution, attendance at parent-teacher meetings, and disciplinary support, and not active participation in learning activities (Muigai, 2018). However, with the advent of the CBC model, parents have to play a greater role in supporting children's learning through hands-on experience, practical skills development, and ongoing evaluation. Saoke et al. (2025) argue that parental involvement is a key component in enhancing learning in the CBC framework. STEM practicals, such as experiments, projects, and problem-based tasks—require not only classroom instruction but also extended learning beyond the school environment.

Parental involvement is widely recognised as a significant factor influencing learners' academic achievement, especially in practical and skill-based subjects. In the context of Science, Technology, Engineering, and Mathematics (STEM), parental support plays a crucial role in reinforcing classroom learning, especially during practical activities that require observation, experimentation, and application of concepts. However, effective parental involvement is influenced by multiple factors, including communication, literacy levels, and language proficiency. The implementation of the Competency-Based Education (CBE) in Kenya has significantly redefined the role of parents in education. Unlike the previous system, the 8-4-4, which was a content-based system, CBE emphasises continuous assessment, project-based learning, and home-supported activities, making parents active participants in their children's learning process. STEM practicals under CBE often extend beyond the classroom, requiring parental guidance, supervision, and resource support.

According to Epstein and Sheldon (2019), effective parental involvement in their children's education includes assisting them with homework, attending school activities and maintaining communication with teachers. This study examined the role of parents in supporting learners with STEM practicals. The major changes introduced in the CBE framework include the introduction of parents as co-educators whose role is

to assist their children in carrying out assignments while at home, providing the required materials, and supervising activities. Parents play a role in children's learning, including offering academic support, giving motivational and emotional support, reinforcing responsibility and discipline, and bridging the homeschool gap (Deysolong, 2023). Despite the central role that parents can play in children's education, research has demonstrated the poor involvement of parents in children's education in the CBE system in Kenya (Ajuoga & Keta, 2021; Amunga et al., 2020). Among the reasons highlighted by these scholars for the non-involvement of parents in CBE are unwillingness, lack of sensitisation on CBE, lack of cooperation from teachers, insufficient time, and negative attitude towards CBE. This research underscores the linguistic barriers that influence parental involvement in STEM practicals.

Despite policy emphasis on parental engagement, the language barriers remain a significant challenge in the Kenyan context. Kenya is linguistically diverse, with English and Kiswahili as official languages, but many parents, especially in rural and peri-urban areas, are more proficient in local languages. STEM instructional materials, however, are predominantly delivered in English, often using technical terminology that may not be easily understood by parents. This linguistic gap can limit parents' ability to interpret instructions, assist with practical assignments, or communicate effectively with teachers. Consequently, learners may not receive adequate support at home, potentially affecting their performance in STEM subjects.

The studies by Muigai (2018), Ajuoga and Keta (2021), Amunga et al. (2020), and Deysolong (2023) examined parental involvement in supporting the education of their children through active participation in learning activities and motivational and emotional support. However, they fail to recognise how language barriers may hinder the role of parents as co-educators as stipulated in the Competency Based Education (CBE) framework. This study fills the gap by examining how language-related challenges, including limited proficiency in English, unfamiliarity with scientific terminology, and lack of access to translated instructional materials, affect effective parental involvement in supporting learners' STEM practical activities conducted both at home.

Theoretical Framework

The Epstein Model of Parental Involvement (Epstein, 1995, 2011) and Vygotsky's Social Constructivism Theory (Vygotsky, 1978) provided frameworks that guided this study. Joyce L. Epstein's Model of Parental Involvement provides a useful framework for understanding how families, schools, and communities collaborate to enhance learning outcomes. In CBE implementation in Kenya, the role of parents is defined as co-educators whose role is to facilitate learning by helping learners in home-based projects and providing resources for practical work. Within this framework, Joyce L. Epstein's Model of Parental Involvement provides a useful lens for understanding how parents engage with schools in supporting learners. The Epstein model is applicable in the study in the following domains:

Parenting: This concept helps in pointing out basic obligations to be undertaken by a parent, for instance, establishing home environments that support schooling children. In STEM, it is applicable where a parent should provide a conducive environment to conduct a science practical.

Learning at home: This is where parents at home are capable of guiding learners to undertake assignments given to them by teachers.

Communicating: Suitable forms should be designed at school and at home. In the STEM practical, it is applicable where a teacher sends instructions for a take-home project, a parent interprets and understands them and guides a learner efficiently.

Volunteering: A parent offers support at school by using a parent as a resource person to teach technical skills to learners. For example, in the learning area of agriculture, a parent can be involved through offering support using demonstration strategies.

This study heavily intersects with the domain Learning at Home, which involves ideas and materials to help parents assist their children with homework (Epstein, 1995, 2011). This is ideal for the study in that parents will play their role as co-educators by providing materials for the STEM practical assignments and guiding them to carry them out.

Vygotsky's Social Constructivism Theory (Vygotsky, 1978) also underpins this study, emphasising that learning is achieved through social interaction and mediated by language and cultural artefacts. This theory emphasises that learning is a process in which learners build their knowledge. The theory emphasises the role of more knowledgeable others, such as parents, in supporting learners within the scaffolding process, where instructional methods break complex problems into manageable steps, and the Zone of Proximal Development (ZPD) (Vygotsky, 1978). Within STEM practical learning, the Zone of Proximal Development (ZPD) represents the difference between a Grade 6 learner's independent abilities and what they can accomplish with support. In CBC, STEM practical assignments are intentionally designed to require a More Knowledgeable Other (MKO) to help the child navigate the ZPD. In the context of STEM practical activities under the Competency-Based Curriculum, parents play a critical role in guiding learners during home-based tasks. However, language barriers may hinder effective communication, thereby limiting the scaffolding process and constraining learners' cognitive development.

METHODOLOGY

This study employed the mixed-methods approach, which combines quantitative and qualitative approaches. The mixed-methods approach is suitable for the study because it will help in the comprehensive understanding of the 'what' (via data) and the 'why' (via human experience. This answers statistical trends with in-depth contextual insights. The study used the explanatory sequential design, which enabled the researcher to collect quantitative data first, followed by qualitative data. Quantitative data establishes the prevalence of language barriers across Matungu Sub-county, while qualitative data captures the lived experiences and emotional frustrations of the parents. The research design was ideal for the study because it helped in explaining the statistical results collected on linguistic barriers affecting parental involvement. The study used surveys and interviews for data collection. The target population is parents of learners in Grade 6, the teachers teaching STEM and parents of the Grade 6 learners of sampled schools. The five selected schools for the study were purposively selected and were to meet the following criteria: Be primary schools offering the CBE curriculum, be in Matungu sub-county and be either public or private.

The data collection instruments included focus group discussions (FDGs) with parents of learners in Grade 6 to examine linguistic barriers affecting their support and interview guides for teachers, which were ideal for gathering in-depth information about language barriers and their impact on parental involvement. The study used Yamane (1967) formula to calculate the parents' sample size based on the Grade 6 learners' enrolment of 4700 in Matungu Sub-County. This yielded a sample of 368 parents with children in Grade 6. The parents were purposively selected from Grade 6 parents and had to meet the following criteria: Aged 24-60 years, be conversant with English and Kiswahili languages, be able to read and be conversant with the CBE framework and STEM as a learning area. During the study, the researcher used two languages, English and Kiswahili, for cases where parents needed translation. The researcher purposively selected 10 per cent of the 100 teachers handling the Grade 6 learners, giving a sample size of 10 teachers who were interviewed. The teachers selected, were to be teaching STEM in Grade 6 to learners in Matungu Sub-County.

Quantitative data were analysed through descriptive analysis to quantify the extent to which language barriers affect parental involvement in STEM practical assignments, while qualitative data were analysed through thematic analysis, which was ideal in identifying common themes related to language barriers and parental involvement.

The researcher considered the following ethical considerations to enhance the credibility of the study. The principal researcher first sought the parents' informed consent to audio-record the discussions and moderated the FGDs. The researcher sought permission from NACOSTI to enhance observation of the ethics considered when interviewing respondents in research. The researcher maintained confidentiality by considering the anonymity of participants in the FGDs by giving them tags such as discussant 1 and discussant 2 for anonymity.

FINDINGS AND DISCUSSION

This section presents findings on the types of language barriers that hinder parental involvement in STEM practical activities within the Competency-Based Education (CBE) framework. Data were obtained from parents and teachers through interviews for teachers and Focus Group Discussions (FGDs) for the parents with grade 6 learners. Through descriptive analysis, the data were calculated and given in percentage form using the formula:

$$\text{Percentage} = \frac{\text{Number of participants in the group}}{\text{Total Number of participants}} \times 100$$

Number of language barriers that hinder parental involvement in STEM practical activities within the competency-Based Education (CBE) were identified. The barriers are discussed below.

Limited Proficiency in the Language of Instruction

The first area of focus is limited proficiency in the language of instruction. The FGD accounts revealed divergent reactions to proficiency in the English language by the parents and their impact on assignments given to learners. A majority of parents reported difficulty understanding instructions provided in English.

According to the quantitative findings, the majority of parents reported that difficulties with the language of instruction posed a significant challenge, as presented below:

Significant barrier: 60 per cent (221 participants), Moderate barrier: 25 per cent (92 participants) and No barrier: 15 per cent (55 participants).

The qualitative data collected using the FGDs revealed that parents who did not understand the English language were unconfident about guiding learners in STEM practical assignments. It was revealed that most parents could easily interpret STEM instructions written using simple English, whereas those written using high-level English were not easily understood, hence hindering their involvement in CBE STEM practical assignments as co-educators.

The results of the interview conducted by the teachers confirmed that many parents rely on learners to translate instructions, which they may do incorrectly, thus interfering with the objective of the assignment. Limited proficiency in the language of instruction reduces parents' ability to guide learners effectively during home-based practicals. Many STEM instructions are delivered in English. This poses a challenge, as parents with limited English proficiency may struggle to translate the scientific concepts into indigenous languages, which may lead to incorrect guidance, thus not effectively supporting the child's learning. This also affects their ability to interpret assignment guidelines and follow procedural steps in experiments. This reduces the ability of parents to support during home-based practicals.

Vygotsky's (1978) Social Constructivism theory accounts for the need for efficiency in the language of communication to enhance learning, which occurs through social interaction and is mediated by language and cultural tools. The theory accounts that parental involvement in STEM practical assignments will enhance learning, a process in which learners build their knowledge.

Technical/Scientific Terminology Barrier

Most of the parents interviewed in this study expressed challenges in understanding STEM–specific vocabulary used in presenting the practical. The quantitative findings revealed that the interpretation of technical /scientific terminology barrier posed a challenge to the parents, as indicated below:

Significant barrier: 50 per cent (184 participants), Moderate barrier: 40 per cent (147 participants) and No barrier: 30 per cent (110 participants).

The qualitative data collected using the FGDs revealed that parents could not interpret the vocabulary used and were unable to interpret correctly the tasks given, which resulted in misinformation. This is evident in the extracts, which indicated that most parents lacked basic knowledge in unravelling the meaning of the terms used in the STEM practical assignment.

The extract from the teachers' interview indicated that most parents did not have an understanding of the terminologies used in STEM practicals.

"Even when parents can read English, they cannot clearly interpret the scientific terms used hence may confuse them."

This is because the terminologies used in the STEM practicals are specific to science, which the parents may not have a clear interpretation of to ascertain what the assignment requires them to do, which hinders their involvement. Technical terminology acts as a major barrier, limiting meaningful parental engagement in STEM activities. STEM uses specialised vocabulary (e.g., "hypothesis," "measurement," "variables"). The scientific terms are multi-syllabic or lack direct equivalents in Kiswahili or the students' native languages. This has a negative impact on the parents, who may only understand Basic English and hence may struggle with subject-specific jargon and abstract scientific concepts, which may result in misinterpretation and misunderstanding of tasks or incorrect guidance. This also results in erosion of parental self-efficacy. In situations where parents cannot interpret the technical vocabulary used in STEM practical assignments, their confidence as co-educators diminishes. It may also affect the parents' role as active participants in their child's skills development.

Lack of Translation into Local Languages

The descriptive data collected using FGDs revealed the following on the barrier of lack of translation into local languages, as shown below:

Significant barrier: 55 per cent (202 participants), Moderate barrier: 25 per cent (92 participants) and No barrier: 20 per cent (74 participants).

A great number of the participants had an issue with the lack of translated materials, as most of the CBE materials for STEM are written in English, as evident in the practical assignments found in the Integrated Science textbooks used in the study. The qualitative data collected from using the FGDs indicated that the lack of translated materials had a negative impact on parental involvement in guiding learners with the STEM practical assignments for Grade 6 learners in Matungu sub-county. An extract from the FGDs revealed that the parents were exposed to STEM practical materials only written in English, which is the language of instruction for Grade 6 learners in the STEM learning area under the CBE framework. They revealed that they have not interacted with STEM practical instructions written in Kiswahili.

The study found that most instructional materials are not available in local languages. The CBE materials and instructions used in STEM practicals are rarely translated into Kiswahili or the indigenous languages spoken by parents and teachers. As a result, parents may rely on children, since they understand Basic English taught at school, to interpret instructions, which weakens effective parental guidance. The data collected using the FGDs revealed that the writing instructions for the STEM practical assignments should be bilingual, such that some are done in Kiswahili or the local languages, which will facilitate their interpretation and support for their children.

Epstein's (1995/2011) parental model accounts for the need for efficiency in communication, which enhances parents providing guidance in STEM practical assignments for Grade 6 learners in Matungu Sub-County. This explains the need for the STEM practical assignments to be presented in language that the parents understand, hence making it easy to assist learners.

Written vs Oral Communication Barrier

The descriptive data collected using FGDs revealed the following on the barrier of lack of translation into local languages, as shown below:

Significant barrier: 65 per cent (239 participants), Moderate barrier: 20 per cent (74 participants) and No barrier: 10 per cent (55 participants).

The qualitative analysis revealed that most of the STEM practical assignment instructions include complex syntax and procedural instructions to be followed when performing them, which may pose a challenge to parents. It was found that most parents prefer oral communication as a method of communication. Most instructions on STEM practicals given to learners are mostly in written form, which may pose a challenge to parents who have difficulty interpreting written instructions, as they are multi-step.

The findings revealed that, from the samples of STEM instructions presented on performing a sample task, most parents had a challenge with interpreting written instructions as compared to the verbal ones, which they perceived to be easy. This affected the quality of their support to the learners. Most parents preferred

oral explanations to written communication as a remedy to the barrier. Reliance on written communication excludes parents with low literacy levels, reducing their involvement. The instructions for STEM practical assignments are often communicated in written form, for example, printed in textbooks or on paper. Parents with low literacy levels whose preference is for oral communication may struggle to engage. This may result in exclusion of parents from active participation in STEM practicals. The written vs oral communication barrier may also result in delayed communication in schools. This is evident in the process of school-to-home communication.

Epstein's (1995, 2011) model on parental involvement accounts for the need for communication. This domain accounts for the need for suitable forms to be designed at school and at home. In the STEM practical, it is applicable where a teacher sends instructions for a take–home project, a parent interprets and understands them and guides a learner efficiently. Most communication is done through diaries in which communication is done through English, or instructions written by the learners in their exercise books, in their textbooks or through the use of digital platforms like WhatsApp, emails or SMS. This may involve the use of abbreviations and mixed codes, hence posing a challenge to parents interpreting the coded language, resulting in miscommunication and little participation in STEM practical assignments.

CONCLUSION AND RECOMMENDATIONS

Conclusion: The implementation of CBE in Kenyan schools has faced several hurdles, including limited parental involvement due to language barriers. From this study, it is evident that CBE implementation and success lie in the role of parents in aiding the learning of their children by being co-educators and providing guidance in STEM practical assignments. This is, however, affected by language barriers, which affect the support offered by parents in directing and assisting learners. Language barriers significantly undermine parental guidance on STEM practical assignments by creating a 'comprehension gap' between the curriculum's technical demands and the parents' linguistic proficiency, which may exclude the parents from the learning process.

Recommendations: This study provides the following recommendations. The Introduction of bilingual instruction manuals for STEM practicals to help support parents who are fluent in local languages or Kiswahili for easy guidance of the learners. The Ministry of Education, in conjunction with other stakeholders, should strive to sensitise parents on their role in CBE implementation as co-educators using local languages. The teachers handling STEM practical areas should embrace the design of STEM projects that use improvised and locally available resources that can be explained through everyday local vocabulary for easy interpretation.

REFERENCES

Ajuoga, M., & Keta, E. (2021). Competency based curriculum for Kenyan primary schools: Implementation challenges among stakeholders in Kenya. *International Journal of Innovative Research and Advanced Studies, 8*(3). https://www.ijiras.com/2021/Vol_8-Issue_3/paper_8.pdf

Amunga, J., Were, D., & Ashioya, I. (2020). The teacher-parent nexus in the competency-based curriculum success equation in Kenya. *International Journal of Educational Administration and Policy Studies, 12*(1), 60–76. https://doi.org/10.5897/IJEAPS2020.0646

Casey, K. (2018). *Moving toward mastery: Growing, developing and sustaining educators for competency-based education*. Aurora Institute. https://www.aurora-institute.org/wp-content/uploads/Moving-Toward-Mastery.pdf

Deysolong, J. (2023). *The crucial role of parent involvement in the learning process of students*. https://doi.org/10.6084/m9.figshare.22999787.v2

Epstein, J. L. (1995). School/family/community partnerships: Caring for the children we share. *Phi Delta Kappan, 76*(9), 701–712.

Epstein, J. L. (2011). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Routledge.

Henderson, T. (2018). *Parent-teacher relationships in cyber charter schools: Investigating the quality of the parent-teacher relationship and its impact on student achievement* (Doctoral dissertation, Duquesne University). Duquesne University Electronic Theses and Dissertations. https://dsc.duq.edu/etd/1732

Kenya Institute of Curriculum Development. (2019). *Parental roles*. https://kicd.ac.ke/wp-content/uploads/2019/07/SERIES-5-FParental-Roles.pdf

Millar, V. (2020). Trends, issues and possibilities for an interdisciplinary STEM curriculum. *Science & Education, 29*(4), 929–948. https://doi.org/10.1007/s11191-020-00144-4

Ministry of Education. (2019). *Curriculum reforms policy framework*. Government of Kenya.

Mudaly, R., & Chirikure, T. (2023). STEM education in the Global North and Global South: Competition, conformity, and convenient collaborations. *Frontiers in Education, 8*, Article 1144399. https://doi.org/10.3389/feduc.2023.1144399

Muigai, J. W. (2018). Parental involvement in primary schools in Kenya as a major strategy for academic success. *European Journal of Education Studies, 5*(3), 236–251. https://doi.org/10.5281/zenodo.1466086

Saoke, V. O., Ndwiga, Z. N., Githaiga, P. W., Gitonga, C. M., Kubai, K. I., Nzomo, C. M., … Ngicho, D. O. (2025). The relationship between teachers' planning and content delivery using the five-stage lesson plan structure: An analysis of age, gender, experience and academic qualifications in Kenya. *European Journal of Education, 60*(1), e70021. https://doi.org/10.1111/ejed.70021

Organisation for Economic Co-operation and Development. (2020). *The future of education and skills: Education 2030*. OECD Publishing.

UNESCO. (2021). *Global education monitoring report 2021: Competency-based education*. UNESCO Publishing.

Voorhees, R. A. (2001). Competency-based learning models: A necessary future. In R. A. Voorhees (Ed.), *Measuring what matters: Competency-based learning models in higher education* (New Directions for Institutional Research, No. 110, pp. 5–13). Jossey-Bass. https://doi.org/10.1002/ir.7

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wambui, D. A. (2024). Competency-based education: Shifting focus from grades to skills. *Research Output Journal of Arts and Management, 3*(3), 13–18. https://rojournals.org/competency-based-education-shifting-focus-from-grades-to-skills/

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.