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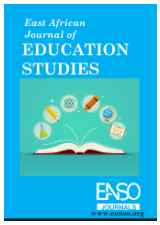

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Original Article

Teachers of Mathematics: Induction and Its Effect on CBC Implementation and Mathematics Performance among 4th Grade Pupils in Machakos Sub-County, Kenya

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CBC, Mathematics, Teachers, Induction, 4th Grade Pupils.

ABSTRACT

Despite the introduction of the Competency-Based Curriculum (CBC) aimed at improving practical skills and competencies, persistent problems remain, including inadequate teacher training, limited resources, and large class sizes. The research was guided by the objective of establishing how Mathematics teachers' induction on CBC affects performance in Mathematics; the study adopted the constructivist theory of learning. This study employed a mixed-methods research design. The target population included all primary schools, head teachers, 4th grade mathematics teachers, and 4th-grade pupils from both public and private primary schools. The sample size consisted of 64 public primary and 17 private schools, 24 head teachers, 24 4th grade mathematics teachers, and 337 4th-grade pupils. A Simple random sampling technique was used to select respondents. The reliability of the instruments was assessed using Cronbach Alpha. The quantitative data were analysed in percentages and frequencies using SPSS Version 28, while qualitative data was analysed using Thematic Analysis. The results of the study demonstrated that teachers were adequately inducted on CBC. The study recommends that the Ministry of Education should create comprehensive and ongoing professional development programs that focus not only on the theoretical aspects of the Competency-Based Curriculum (CBC) but also on practical application in the classroom. They should ensure that schools have sufficient teaching resources and materials aligned with the CBC framework, implement robust accountability systems for teachers to ensure consistent participation in professional development programs and adherence to CBC standards, and encourage schools to actively involve parents and communities in the learning process, especially in mathematics education.

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INTRODUCTION

Education systems around the world have evolved significantly in recent decades, reflecting shifts towards more holistic, learner-centred approaches. Competency-based curriculum (CBC) is one such approach that emphasises students' ability to apply knowledge and skills in real-world contexts rather than simply memorising facts (Boud and Falchikov, 2006). The goal of this paradigm shift is to develop students who are not only informed but also qualified and adaptable (OECD, 2015). Competency-based education (CBE) has been introduced worldwide with varying degrees of success. For example, in the United States, CBE has been integrated into many state education systems to ensure that students achieve specific competencies before advancing to the next level (The Wallace Foundation, 2016).

The effectiveness of these programs has been mixed, with some studies suggesting improved student engagement and performance, while others highlight issues such as inadequate teacher preparation and resource constraints (U.S. Department of Education, 2016). In Australia, the adoption of a competency-based approach has been associated with significant changes in curriculum design and assessment methods. The Australian Curriculum, Assessment and Reporting Authority (ACARA) has highlighted the importance of providing opportunities for students to demonstrate their abilities in a range of areas of education (ACARA, 2016). This approach has been well-received, particularly in the vocational education and training sectors, where it is well-suited to the needs and expectations of the industry (Smith and Keating, 2013).

In Africa, the shift towards competency-based education reflects wider regional trends towards improving the quality and relevance of education. Many African countries have recognised the need for educational reforms that address both high school dropout rates and the mismatch between educational outcomes and labour market needs (African Union, 2018). Competency-based curricula are seen as a way to equip students with practical skills that are more relevant to the demands of the 21st century. In countries such as Nigeria and Ghana, competency-based education has been introduced as part of broader education reforms aimed at improving the quality of learning and teaching (Okebukola & Mugisha, 2016). In these regions, the emphasis is often on improving literacy and numeracy along with practical competencies that can facilitate economic development and personal empowerment (World Bank, 2017). The East African region has also been active in reforming its education systems. For example, Uganda and Tanzania have implemented competency-based approaches to improve

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educational outcomes and align curricula with regional and global standards (Okebukola & Mugisha, 2016). This effort is part of a broader regional strategy to increase the quality and relevance of education in East Africa.

In Kenya, the shift to a competency-based curriculum (CBC) represents a significant departure from the traditional 8-4-4 system to a model that prioritises student-centred education and the development of practical skills (Kenya Institute of Curriculum Development, 2018). CBC was introduced to address the shortcomings of the previous curriculum, which was criticised for its emphasis on rote learning and limited focus on skill application (Gikunda, 2017). Implementation of CBC in Kenya began in 2017 to improve educational outcomes by focusing on competencies such as critical thinking, problem-solving, and communication skills (Republic of Kenya, 2019). This approach is in line with the global trend towards competency-based education but is adapted to meet local educational needs and contexts. In Machakos Sub-County, the implementation of CBC encountered various challenges and opportunities. Teachers were trained to adapt to the new curriculum, and schools were provided with new materials and resources (Machakos County Education Office, 2020). However, the effectiveness of these efforts in improving student performance, particularly in subjects such as mathematics, remains an area of active research and evaluation.

Even though there is no problem with borrowing from other educational systems globally, there is evidence that Kenya's curriculum developers took into consideration the capacity of teachers' training and their preparedness to transition into a new curriculum by training different education field officers who are involved in the implementation of the Competence-Based Curriculum (Ondimu, 2018). In Machakos Sub-County, the problem of poor math performance among fourth-grade primary school students persists. This issue is serious because mathematics is a foundational subject that is critical to students' overall academic development and future opportunities.

Statement of the Problem

In Machakos sub-county in Kenya, the issue of poor math performance among fourth-grade primary school students persists. This is a significant problem because mathematics is a foundational subject crucial to students' overall academic development and future opportunities. Despite the introduction of the Competency-Based Curriculum (CBC), which aimed to enhance educational outcomes by emphasising practical skills and competencies, student performance in mathematics remains below average. This highlights a crucial research gap that needs attention.

A competency-based curriculum aims to shift the focus of education from rote learning to the development of practical skills and competencies relevant to students' daily lives. However, there is a lack of detailed research on how effectively the CBC is being implemented in Machakos sub-county and its impact on mathematics performance. Research gaps include the absence of localised studies on the practical application of the CBC, failure to examine contextual issues, and a lack of systematic evaluation mechanisms. Addressing these gaps is essential to developing targeted strategies to improve math performance and ensure that the CBC effectively meets the educational needs of students in the region.

Purpose of the Study

The purpose of the study was to examine the influence of teachers' induction on the CBC on performance in mathematics among grade 4 primary school pupils in Machakos sub-county, Kenya.

LITERATURE REVIEW

The implementation of competency-based curricula (CBC) has received significant attention worldwide, particularly in terms of its impact on student performance in key subjects such as mathematics.

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The primary objective of the CBC is to equip students with the essential skills and competencies that will enable them to effectively navigate real-world challenges. In various educational contexts, several studies have shown that CBC can lead to increased student engagement and improved performance, especially when teachers are adequately trained and supported in new pedagogical approaches (Wiggins & McTighe, 2005). Globally, the move towards CBC reflects a growing recognition that simply imparting knowledge is not enough to prepare students for a complex and rapidly evolving world (UNESCO, 2016).

Countries such as Finland and Singapore have adopted CBC principles and integrated experiential learning and critical thinking into their mathematics curricula. Research has shown that students in these systems demonstrate higher levels of mathematical reasoning and problem-solving skills compared to their peers in traditional curricula (Killen, 2015). The success of these models underscores the importance of teacher training and ongoing professional development in effective CBC implementation, as teachers are instrumental in translating curriculum goals into classroom practice (Darling-Hammond, 2017). In the African context, the challenges associated with CBC implementation are linked to various socio-economic and infrastructural factors. Many countries on the continent, including Kenya, have embarked on curriculum reforms aimed at aligning educational outcomes with the needs of the labour market and society (African Union, 2018). The African Union's Agenda 2063 emphasises the importance of education in promoting innovation and economic growth and highlights the need for competency-based approaches (AU, 2018). However, the extent to which these reforms improve student performance in mathematics remains insufficient.

In Kenya, CBC implementation is characterised by optimism and apprehension. The Kenya Institute of Curriculum Development (KICD) has spearheaded the implementation of CBC, which emphasises student-centred teaching methods, practical application of knowledge, and an assessment framework that reflects competence rather than mere retention of content (KICD, 2019). The aim of this reform is to improve performance in critical subjects such as mathematics, which are the foundation of science and engineering education. However, the successful implementation of CBC in Kenya largely depends on the readiness and support of teachers. Studies reveal that many teachers feel inadequately trained to effectively implement the new curriculum, raising concerns about the quality of mathematics education (Ochieng & Namasasu, 2020). Teacher training programs are essential to equip educators with the skills and confidence needed to successfully implement CBC. A well-structured adaptation process can increase teachers' content knowledge and pedagogical skills, which in turn can improve student achievement (Ingersoll, 2001). Research shows that engaging teachers in CPD initiatives fosters a deeper understanding of competency-based methodologies, enabling them to effectively implement innovative teaching strategies (Guskey, 2002).

In Kenya, teacher professional development models that are collaborative, ongoing, and contextually relevant have shown promise in improving teacher capacity, thereby improving student achievement in mathematics (Ngoya, 2021). In conclusion, while the implementation of a competency-based curriculum presents opportunities to improve fourth-grade students' mathematics achievement in Machakos Sub-County, it requires a concerted effort in teacher education and sustained support. Experiences from global practice and African contexts underscore the essential role of well-prepared educators in a successful transition to a competency-based approach. Future research should delve deeper into specific strategies that can effectively support teachers in this transformation and ultimately contribute to improving outcomes in mathematics education.

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Theoretical Framework

One of the most important theories for studying competency-based curriculum (CBC) implementation and mathematics performance among fourth-grade students is the constructivist theory of learning. Constructivism, developed from the works of leading theorists such as Jean Piaget and Lev Vygotsky, assumes that students construct their understanding and knowledge of the world through experiences and reflections on those experiences (Piaget, 1973; Vygotsky, 1978). This theory is particularly relevant to CBC in Kenya, which emphasises active student participation, problem-solving, and application of knowledge in real-world situations. In a competency-based curriculum, the emphasis is on competency rather than simply delivering content.

Constructivism is consistent with this focus as it advocates active learning where students are encouraged to explore, ask questions, and engage in hands-on activities. For example, in math classes, students can work in groups to solve real-world problems, allowing them to apply math concepts in practical contexts. This experiential learning approach can potentially lead to deeper understanding and retention of mathematical concepts among fourth graders in Machakos Sub-County (Ngoya, 2021). Constructivism encourages active involvement in the learning process, increasing motivation and interest among students, especially in subjects such as mathematics, which may be perceived as challenging by some students (Bransford et al., 2000). By encouraging students to explore and investigate, constructivist methods promote critical thinking and problem-solving skills, necessary in the context of CBC, which aims to equip students with the skills necessary for the 21st century (UNESCO, 2015). Constructivist theory recognises the role of social interactions in learning, as emphasised by Vygotsky. Working together in a group promotes communication skills and allows for mutual learning that can be beneficial in different classrooms (Vygotsky, 1978).

In Kenya, many teachers may still rely on traditional teaching methods, leading to inconsistencies in how CBC is delivered (Orodho, 2018). Constructivist learning often requires a variety of resources and materials to facilitate practical activities. In under-resourced schools, a lack of materials can hinder the effective implementation of a competency-based curriculum (World Bank, 2022). Standardised testing methods focus primarily on memorisation and transfer of content, which may not adequately assess competencies cultivated through constructivist methods. This mismatch can create pressures to return to traditional teaching methods (Wiggins & McTighe, 2005).

In conclusion, Constructivist learning theory presents a robust framework for understanding and implementing mathematics competency education among fourth graders in Machakos County, Kenya. While its strengths, such as encouraging active engagement and critical thinking, are consistent with CBC, challenges related to teacher readiness, resource availability, and assessment methods may hinder its full implementation. Addressing these challenges is critical to improving educational outcomes and achieving the goals of Kenya's education reforms.

METHODOLOGY

Research Design

The research design used in this study focused on the implementation of a competency-based curriculum and its impact on the performance of fourth-grade primary school students in Machakos Sub-County, Kenya. It utilised a mixed-methods approach, combining quantitative and qualitative research methodologies to offer a thorough analysis of the subject. The quantitative component involved a survey design where standardised math test scores were gathered from fourth graders at specific elementary schools to evaluate their performance (Creswell, 2014; Johnson & Onwuegbuzie, 2004). The target population included all primary schools, head teachers, 4th grade mathematics teachers, and

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4th-grade pupils from both public and private primary schools. The sample size consisted of 64 public primary and 17 private schools, 24 head teachers, 24 4th grade mathematics teachers, and 337 4th-grade pupils. A Simple random sampling technique was used to select respondents. The reliability of the instruments was assessed using Cronbach Alpha. The quantitative data were analysed in percentages and frequencies using SPSS Version 28, while qualitative data was analysed using Thematic Analysis.

RESULTS AND DISCUSSION

Teachers' Induction on CBC and the Performance in Mathematics

The study sought to establish the effect of teacher induction on CBC on the Mathematics performance of 4th Grade 4 pupils in Machakos Sub-County. The 4th Grade teachers were asked to rate statements related to their induction to CBC on a scale of 1-5, where **1 = Strongly Disagree (SD),** 2 = **Disagree (D), 3 = Undecided (U), 4 = Agree (A), 5 = Strongly Agree (SA)**

Summary statistics on Grade 4 Mathematics Teacher Induction on CBC

Variable	SD %	D %	U %	A %	SA %	Mean	Std. Deviation
The ministry conducted an adequate induction on the CBC curriculum	25.0	0.0	25.0	25.0	25.0	3.25	0.50
The content of the induction program was adequate	0.0	25.0	25.0	25.0	25.0	3.25	0.5
The frequency of induction was adequate	25.0	25.0	25.0	25.0	0.0	2.10	0.0
The content of the induction program was relevant to the implementation of CBC.	0.0	25.0	0.0	25.0	50.0	4.50	0.58
The induction program has improved my skills and knowledge on the implementation of CBC.	25.0	25.0	0.0	25.0	25.0	3.75	0.50

Mean: Strongly Disagree =1.00-1.80, Disagree =1.81-2.60, Not Sure=2.61-3.40, Agreed =3.41.4-20, Strongly Agree =4.21-5.00

Kenya, regarding its induction into the Competency-Based Curriculum (CBC) implementation in mathematics. Notably, perceptions were mixed across various aspects of the induction program. For instance, 25% of respondents strongly disagreed on the adequacy of induction conducted by the ministry, revealing concerns about the preparedness of educators. However, a significant 50% agreed that the content of the induction program was relevant to the implementation of CBC, which indicates a positive alignment between induction content and curriculum objectives. The program's impact on skill enhancement was also acknowledged, with an equal distribution (25%) across "Strongly Disagree," "Agree," and "Not Sure." These findings suggest a need for continuous improvement in the induction processes, potentially by increasing frequency and expanding relevance to foster teacher confidence and competence in CBC implementation. Continued investment in professional development could enhance the quality of mathematics instruction among pupils (Bishop, 2022; Smith et al., 2021).

Thematic results on Teachers' Induction on CBC and the Performance in Mathematics

In the study, the researcher conducted interviews among primary school head teachers to find out the extent of teacher induction in the implementation of CBC. The head teachers were asked whether the

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teacher induction exercise helped the teachers of mathematics in the performance of mathematics. Qualitative interviews with head teachers revealed that teachers' induction on the implementation of CBC was very instrumental and has made them competent, therefore leading to better performance of the students in Mathematics. For instance, head teachers were asked the following question: Has the teacher induction exercise helped your teachers in the performance in Mathematics? The following are some responses from some sampled school heads.

One head teacher pointed out:

> *"…Yes, they are well equipped with the right methodology and skills, although in some topics the learners do not perform well." (HT1)*

Yet, another head teacher had this view:

> *"...This induction is impacting well in the classroom teaching because this is refreshing, hence improving the performance in mathematics. "(HT2)*

A head teacher had this to say:

> *"... Induction was very critical in helping teachers to acquire relevant skills for the new curriculum, and all these teachers studied the old 8.4.4 system." (HT3)*

Another head teacher stated:

> *"...Teachers need frequent training to effectively implement the Competency-Based Curriculum in mathematics instruction." (HT4)*

A head teacher added:

> *"....We observed a marked improvement in pupils' problem-solving skills after CBC training for teachers."(HT5)*

A head teacher commented:

> *"...Parental involvement is crucial; fully engaged parents support their children's understanding of CBC math concepts."(HT6)*

Another head teacher opined:

> *"…The Resources and materials available for teachers significantly impact how they teach mathematics under CBC." (HT7)*

Another head teacher posited:

> *"…With proper training, teachers can motivate students and make mathematics more engaging through CBC."(HT8)*

Qualitative findings from school principals on the impact of teacher induction on Grade 4 students' performance in mathematics revealed strengths and areas for improvement in the implementation of a Competency-based Curriculum (CBC) in Machakos County. Several principals acknowledged the positive impact of adaptation on teachers' methodology and skills. For example, HT2 noted a refreshing impact on classroom instruction, leading to improved student achievement in mathematics, while HT5 highlighted significant improvements in student problem-solving skills following the training. This is consistent with research findings showing that well-structured teacher adaptation programs can increase teaching effectiveness and student achievement (Bill & Melinda Gates Foundation, 2019).

Conversely, HT1 and HT4 expressed concern about the need for frequent training and the fact that, despite the induction, some topics continued to challenge students' performance. This suggests a gap between theoretical training and classroom applications, indicating the need for ongoing professional development to help teachers effectively address specific mathematical concepts. Additionally, HT6 and HT7 highlighted the importance of parental involvement and the availability of resources in increasing the effectiveness of CBC. Parental involvement significantly supports children's understanding and application of mathematical concepts, as highlighted by Hart et al. (2020).

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Moreover, access to quality resources and materials directly affects teaching methods, facilitating a more engaging learning environment. Finally, HT8 stated that with appropriate training, teachers can better motivate students and increase their engagement in mathematics. This reflects the importance of teacher effectiveness in influencing student motivation and performance and reaffirms the essential role of teacher continuing professional development in achieving CBC goals. In conclusion, while the onboarding process positively impacted teachers' abilities to implement CBC, ongoing training, parent involvement, and access to resources are critical elements that can further improve math performance in Grade 4 students.

SUMMARY AND CONCLUSION

Findings on Grade 4 teachers' perceptions of their inclusion in the Competency-Based Curriculum (CBC) in Machakos Sub-county reveal differing views on the program's effectiveness. While some teachers expressed concerns about the adequacy of the training provided by the department, a significant number of teachers recognised the importance of the content for CBC implementation. The in-service training program is considered effective in improving teacher skills, but there are still differing opinions about its overall effectiveness, suggesting that improvements are needed to build more confidence and competence among educators in implementing CBC. Qualitative findings from school principals further highlight the mixed results of teachers reporting on student performance in mathematics. Principals acknowledged the positive impact of CBC training on teaching methods and skill acquisition, which correlated with improved student achievement and problem-solving skills.

However, some principals noted ongoing issues with certain mathematical concepts, indicating a gap between theoretical preparation and practical application in classrooms. Principals also emphasised the crucial role of parental involvement and access to quality resources in enhancing the effectiveness of CBC. Engaged parents can significantly support their children's understanding and application of mathematical concepts, while available resources can facilitate more engaging teaching methods that promote student engagement. Additionally, principals observed that effective training enables teachers to motivate their students and increase their participation in mathematics. This highlights the importance of continuous professional development in achieving CBC's goals. In conclusion, the adaptation program positively impacted teacher preparedness; ongoing training, active parent involvement, and improved access to resources are essential for further enhancing mathematics outcomes for 4th graders. These components are vital for enriching the learning environment and supporting success in implementing the CBC framework.

Recommendation for Practice.

The study recommends that the Ministry of Education to;

- Ensure provision of Professional development programs that focus not only on the theoretical aspects of the Competency-Based Curriculum (CBC) but also on practical application in the classroom.
- Ensure that schools have sufficient teaching resources and materials aligned with the CBC framework.
- Implement robust accountability systems for teachers to ensure consistent participation in professional development programs and adherence to CBC standards, and encourage schools to actively involve parents and communities in the learning process, especially in mathematics education.

REFERENCES

ACARA. 2016. "*Development of the Australian Curriculum*". Accessed May 18, 2017.

Article DOI: https://doi.org/10.37284/eajes.8.3.3518

African Union (2018). Agenda 2063: The Africa We Want. Addis Ababa: *African Union. American Psychological Association. (2007*). Principles for the effective assessment of learning.

African Union (AU). (2018*). Education Strategy for Africa 2016-2025.* Addis Ababa: AU Commission.

Bill & Melinda Gates Foundation. (2019). *The Education Innovation Initiative*. Seattle: Gates Foundation.

Bishop, J. H. (2022). Effective Strategies for Implementing Competency-Based Curricula. *Educational Leadership Review, 45(1), 78-92.*

Boud, D., & Falchikov, L. (2006). *Improving student learning through effective feedback*. Routledge.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and Schoo*l. Washington DC: National Academy Press.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage Publications.

Darling-Hammond, L. (2017). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 25(5).*

Gikunda, M. (2017). *Implementation of Competency-Based Curriculum in Kenyan Schools*. Nairobi: Kenyatta University Press.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice, 381-8(3), 391.*

Hart, S., et al. (2020). Evaluating the Impact of Competency-Based Education Initiatives. *Journal of Educational Research, 114(2), 123-137.*

Ingersoll, R. M. (2001). Teacher Turnover and Teacher Shortages: An Organizational Perspective. *American Educational Research Journal, 38(3), 499-534.*

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come*. Educational Researcher, 33(7), 14-26.*

Kenya Institute of Curriculum Development (KICD). (2019). *Curriculum Framework for Education and Training.* Nairobi: KICD.

Killen, R. (2015). *Effective teaching strategies: Lessons from research and practice*. South Melbourne: Cengage Learning.

Machakos County Education Office. (2020). *Annual Education Report 2019/2020.* Machakos: Machakos County Government.

Ngoya, A. (2021). The impact of competency-based curriculum on mathematics performance in primary schools. *Journal of Educational Research and Practice, 11(2), 45-58.*

Ochieng, S. (2020). Challenges in Implementing Competency-Based Curriculum in Kenya's Public Schools. *Education Journal, 7(2), 12-19.*

OECD. (2018). *PISA 2018 Results: What Students Know and Can Do. Paris*: OECD Publishing.

Okebukola, P., & Mugisha, J. (2016). *Reforming Education in Africa: Challenges and Opportunities.* Nairobi: African Educational Publishers.

Ondimu, S. M. (2018). *Teachers' preparedness for implementation of the competency based curriculum in private pre-schools in Dagoretti North sub-county*, Nairobi City County. Doctoral dissertation, University of Nairobi.

Orodho, J. A. (2018*). Education and social transformation in Africa: A comparative analysis. Nairobi:* Dynamic Publication.

Article DOI: https://doi.org/10.37284/eajes.8.3.3518

Piaget, J. (1973). *Psychology and Epistemology: Towards a Theory of Knowledge.* Record: Rio de Janeiro.

Republic of Kenya. (2019). *The Education Act and Curriculum Policy*. Nairobi: Government Printer.

Smith, J., & Keating, M. (2013). Innovations in Competency-Based Education. *Journal of Educational Innovation, 25(3), 45-60.*

Smith, L., et al. (2022). Advances in Competency-Based Education: A Global Perspective. *International Journal of Educational Development, 89, 102-115.*

UNESCO. (2015). *Education for Sustainable Development Goals: Learning Objectives. Paris*: UNESCO.

UNESCO. (2016). *Education for Sustainable Development Goals: Learning Objectives. Paris:* UNESCO.

U.S. Department of Education. *(2016). Transforming Education through Competency-Based Learning.* Washington, D.C.: U.S. Department of Education.

Vygotsky, L. S. (1978). Mind in Society: *The Development of Higher Psychological Processes. Cambridge,* MA: Harvard University Press.

Wallace Foundation. (2016). *The School Principal as a Leader: A Conceptual Framework.* New York: Wallace Foundation.

Wiggins, G., & McTighe, J. (2005). *Understanding by Design*. Upper Saddle River, NJ: Pearson Education.

World Bank. (2022). *Kenya's Competency-Based Curriculum: Progress and Challenges*. Washington, DC: World Bank Publications.

