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Research Paper

Teachers Pedagogical Content Knowledge and Implementation of Competency Based Curriculum In Schools In Kenya

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Abstract
The introduction of the Competency-Based Curriculum (CBC) in Kenya places strong emphasis on the development of skills and application of information in practical settings. For schools, the Pedagogical Content Knowledge (PCK) of teachers is essential for effective implementation. This paper examines the concept of PCK and its components and analyses how teachers' PCK influences how well CBC is implemented in schools. The paper links theoretical ideas with real-world applications through theory-practice design. Findings reveal that although many teachers possess extensive subject-matter expertise, gaps in pedagogical techniques, insufficient resources, and limited professional development opportunities hinder the effective integration of CBC concepts into classroom practice. The paper highlights the significance of PCK in achieving CBC goals and equip their young citizenry to flourish and compete effectively globally. Further, the study demonstrates that educators with high PCK are more successful in raising student achievement levels. They are able to identify the misunderstandings that students have, develop effective interventions, and improve learning environments by putting the needs of their learners first. The study leads to the conclusion that improving teachers' pedagogical skills is crucial to achieving CBC's full potential in schools, which will enhance student outcomes and advance the larger objectives of Kenya's educational reforms.The paper highlights the importance of continuous professional development for teachers to enhance their PCK). This development equips them with the necessary tools to foster active learning and effectively assess competencies.

Key words**: **Competency-Based Curriculum, Implementation, Pedagogical Content Knowledge.

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I. Introduction

Globally, countries are reforming their educational systems to Competency-Based, with the shared objective of offering high-quality education to their citizens and to adequately prepare learners for the challenges that emerge due to the rapidly evolving global landscape. In contrast to content-based curricula, Competency-Based Curricula (CBC) provide learners with the knowledge, skills, attitudes, and values essential for future community service. The primary goal of CBC is to equip learners with crucial 21st-century skills, including self-confidence, creativity, imagination, critical thinking, problem-solving, effective communication, and the ability to learn independently. Osha (2012) highlights that CBC focuses more on what learners can accomplish rather than just what they should know. He further explains that CBC seeks to nurture learners' ability to perform tasks, learn continuously, and understand how to acquire knowledge. Mulenga and Kabombwe (2019) assert that for learners to be deemed competent, they must possess a thorough understanding of the subject, the skills to apply this knowledge effectively, and, most importantly, the attitudes that enable them to perform tasks correctly. Furthermore, competency-based curricula encourage higher level thinking in learners, which is why they support the Revised Bloom's Taxonomy.

The successful implementation of a competency-based curriculum (CBC) at all educational levels hinges on teachers' readiness, which includes their skills, knowledge, and attitudes. As the main facilitators of curriculum delivery, teachers need comprehensive preparation through both preservice education and continuous in-service training to fully engage with CBC initiatives

Teachers' Pedagogical Content Knowledge (PCK)

Lee Shulman (1987) introduced the concept of Pedagogical Content Knowledge (PCK), a framework that has profoundly shaped educators' perspectives on teaching and teacher education. Shulman contended that effective teaching demands not only subject matter expertise but also the ability to convey that knowledge in a clear and engaging way to learners. He introduced PCK as the specialized knowledge that integrates pedagogy and content, highlighting how teachers transform their subject knowledge into instructional material tailored to the needs of learners. According to Shulman, PCK includes understanding what makes certain concepts difficult or easy for students to learn, as well as knowing how to present content in ways that address these challenges. PCK includes the strategies and methods that teachers use to make learning accessible, taking into account the students' prior knowledge, misconceptions, and learning needs.Pedagogical Content Knowledge (PCK) is defined as the intricate expertise that teachers build over time through experience, focusing on teaching specific content in a way that enhances students' comprehension (Gess-Newsome, 2015). PCK is now widely recognized as a valuable framework for understanding the distinctive aspects and growth of teachers' knowledge, and research on PCK in teacher education has rapidly expanded. In their article titled "Revisiting the conceptualization of Pedagogical Content Knowledge (PCK): PCK as a Conceptual Tool to Understand Teachers as Professionals", Park, & Oliver (2008) argue that PCK has evolved into a key framework for understanding the professional knowledge that distinguishes teachers from content experts or pedagogues alone. They emphasize the importance of PCK in linking content knowledge with pedagogical strategies, making it a vital tool for effective teaching and learning. Darling-Hammond &Bransford (2005) addresses the importance of teacher knowledge, including PCK, in adapting to modern educational demands, inclusive practices, and shifts towards personalized learning models.

Pedagogical Content Knowledge (PCK) is a vital concept in education, describing the combination of teachers' subject matter expertise and the pedagogical techniques required to teach that content effectively.PCK describes a teacher's capacity to not only comprehend the material but also to communicate it to students in a way that is interesting and approachable. This dual competence in teaching techniques and topic matter is essential for assisting students in navigating the learner-centered approach that the CBC emphasizes(Johnson, 2022; Smith, & Doe, (2023).

Context of Kenya

The adoption of the Competency-Based Curriculum (CBC) in Kenya has resulted in notable departure from conventional knowledge-based approach in favor of an educational framework that is more focused on skills. Teachers play a pivotal part in this shift, as their Pedagogical Content Knowledge (PCK) is essential to the successful implementation and delivery of the CBC.

Kenya's content-based curriculum (8-4-4) is gradually being phased out in favor of the competency-based curriculum (2-6-3-3-3), which addresses criticisms that the former system produced graduates lacking essential skills for the job market. A study by Akala (2021"Revisiting education reform in Kenya: A case of Competency-Based Curriculum". Indicates that the country still faces a shortage of a skilled workforce needed to drive progress toward Kenya Vision 2030, and with high youth unemployment rates, educational reform is essential for achieving these national goals. It has been suggested that the 8-4-4 curriculum had several deficiencies, such as superficial content, an exam-centric approach, misallocation of resources, high teacher-to-student ratios, insufficient teaching materials, and inadequate teacher training, all of which contributed to teachers' lack of preparedness .The Kenya Institute of Curriculum Development (KICD) outlines the objectives and principles of the Competency-Based Curriculum (CBC), which emphasizes developing critical thinking, problem-solving, and life skills over rote memorization. The framework underscores the importance of teachers using Pedagogical Content Knowledge (PCK) to effectively adapt and deliver content, fostering competencies that align with contemporary educational goals (KICD, 2019)

Based on existing research, some studies indicate that a significant percentage of teachers in Kenya have not received adequate training in CBC methods. For example, a study by KICD found that approximately 40-50% of teachers felt unprepared to implement CBC due to gaps in their pedagogical skills and the lack of professional development opportunities. Additionally, resource constraints were cited by over 60% of respondents as a significant challenge in effectively delivering CBC in the classroom. These figures highlight the ongoing need for targeted training programs and better resource allocation to ensure that teachers can effectively integrate CBC concepts into their teaching practices.

A pilot study by the Kenya Institute of Curriculum Development (KICD) and reports from the Teachers Service Commission indicate that teachers are not adequately prepared for the competency-based curriculum. The KICD report (2018) reveals that only 3% of teachers feel sufficiently equipped for the new curriculum.In the rapidly evolving educational landscape of Kenya, the demand for teachers who possess strong Pedagogical Content Knowledge (PCK) has become more critical than ever.The effective implementation of the Competency-Based Curriculum (CBC) depends on teachers' ability to adapt their instructional methods to suit

diverse learning styles and contexts. This highlights the crucial role of Pedagogical Content Knowledge (PCK) in their professional skill set.

Components of Teachers' Pedagogical Content Knowledge

Various scholars (Charalambous& Philipp, 2010; Grossman, 1990; Magnusson, Krajcik, &Borko, 2019; Park & Oliver, 2008; Shulman, 1986) have identified key components of PCK as:

i. **Understanding of learners' knowledge and misconceptions:** Teachers must be aware of typical learning trajectories and misunderstandings within their subject to effectively anticipate and resolve potential learning obstacles.
ii. **Curriculum Knowledge:** This includes familiarity with the required curriculum content, understanding educational standards, and knowing how to organize lessons to meet these objectives.
iii. **Instructional Strategies:** Successful teaching involves using approaches that are specifically adapted to both the subject matter and students' needs, such as direct teaching, hands-on practice, or using analogies and visual representations.
iv. **Authentic Assessment:** Teachers should be skilled in evaluating students' learning through assessments that accurately measure their understanding of the content and their capacity to apply it in different situations.
v. **Reflective Practice:** A key element of PCK is the ability to reflect on teaching experiences, assess the impact of instructional methods, and make adjustments based on classroomevidence.

Study findings by Adadan (2014) from the study "Investigating the development of preservice chemistry teachers pedagogical content knowledge of multiple representations through a case study"reports that most preservice teacher did not have adequate representations for all components of PCK in their knowledge base.

Role of PCK in Implementation of CBC

In implementing Kenya's Competency-Based Curriculum (CBC), Shulman's insights highlight the importance of teachers developing robust Pedagogical Content Knowledge (PCK) to adapt their instructional methods to the curriculum's emphasis on skills, creativity, and active learner engagement. Jones & Moreland (2005) emphasized that successful implementation of any curriculum heavily relies on teachers' mastery of Pedagogical Content Knowledge (PCK), Pedagogical Knowledge (PK), and Content Knowledge (CK). Each of these knowledge domains contributes uniquely to effective teaching, particularly within evolving curriculum models such as Kenya's Competency-Based Curriculum. CK provides the "what," PK the "how," and PCK the "how to teach the what," making these knowledge domains indispensable for effective curriculum delivery and student achievement

Why should teachers consider PCK within their subject areas?

Teachers should consider Pedagogical Content Knowledge (PCK) within their subject areas for several reasons:

Alignment with CBC Goals: CBC focuses on developing learners' skills, competencies, and attitudes rather than just knowledge acquisition. Teachers with strong PCK are better equipped to align their teaching methods with the CBC's emphasis on practical skills, creativity, critical thinking, and problem-solving.OtienoandMwangi(2023) study on"the relationship between pedagogical content knowledge and the promotion of CBC values in Kiswahili language teaching in Kisumu County, Kenya"reveals that teachers with strong PCK are more effective in adapting language of instruction to CBC's holistic goals, fostering students' language proficiency alongside broader competencies.Njuguna and Omondi (2022) investigated "the impact of Pedagogical Content Knowledge (PCK) on the implementation of the Competency-Based Curriculum (CBC) in secondary schools in Kiambu County". Their findings are that teachers with strong PCK align their teaching with CBC goals by designing lessons that emphasize student-centered learning and collaborative projects, which are core components of CBC.KiptooandRop (2021) study "an exploration on how science teachers' PCK affects their ability to meet CBC competencies in UasinGishu County" found that Teachers with solid PCK were more successful at aligning lessons with CBC's emphasis on critical thinking, creativity, and practical skills in science, helping students achieve competencies beyond rote learning. In their 2021 study on "the role of teachers' Pedagogical Content Knowledge (PCK) in achieving Competency-Based Curriculum (CBC) goals in primary schools in Machakos County, Kenya", Mutuku and Kamau found that teachers with strong PCK are better equipped to integrate competency-based methods, such as project-based learning and real-life applications. These methods help students develop practical skills and competencies. MwangiandWanjohi (2020) surveyed on "pedagogical content knowledge and its alignment with competency-based curriculum goals in Nairobi County", the study highlights that teachers with strong PCK are better able to adapt instructional methods and assessment techniques, focusing on competencies like problem-solving and critical thinking in line with CBC's objectives.

Teacher Preparedness for the Implementation of Competency Based Curriculum in Kenya: A Survey of Early Grade Primary School Teachers' in Bomet East Sub-County

Momanyi and Rop's (2019) survey "Teacher Preparedness for the Implementation of Competency Based Curriculum in Kenya: A Survey of Early Grade Primary School Teachers' in Bomet East Sub-County "revealed that teachers had limited understanding of the competency-based curriculum (CBC), which has hindered their ability to effectively deliver and assess it.

Creating engaging and effective educational experiences: Research on teachers' Pedagogical Content Knowledge (PCK) underscores its importance in creating engaging learning experiences essential for implementing Kenya's Competency-Based Curriculum (CBC). Teachers with strong PCK can effectively tailor their teaching methods to CBC's objectives, fostering critical thinking, creativity, and problem-solving in students. Studies from South Korea and the United States illustrate how robust PCK enables teachers to cultivate learning environments that support student autonomy and self-efficacy—key competencies that CBC aims to develop in Kenyan learners (Muchira et al., 2023; Arksey& O'Malley, 2005) . The study by Shabani (2018) "Pedagogical content knowledge and its impact on competency-based curriculum implementation" found that teachers with higher PCK are better equipped to integrate real-world applications, problem-solving activities, and formative assessments, which are key components of CBC. A study by Kabita and Ji (2017) "The why, what, and how of competency-based curriculum reforms: The Kenyan experience" found that teachers with high PCK are able to use active learning strategies—such as project-based and inquiry-based learning which enable learners to connect learning with real-world applications, fostering competencies like critical thinking and creativity, both central goals of CBC.

Adapting Teaching Methods: Teachers with high levels of PCK can adapt their teaching strategies to suit different learners' needs, which is essential for CBC, where personalized learning and differentiated instruction are key.In Kenya the study by Ondimu (2018) "Teachers' Preparedness for Implementation of the Competency-Based Curriculum in Private Pre-Schools in Dagoretti North Sub-County, Nairobi City County, Kenya" reported inadequate curriculum implementation in schools, with limited application of CBC teaching and learning methods in pre-primary schools in Dagoretti North, Nairobi County. Similarly, Kristofa's (2018) study "on challenges facing teachers in Tanzania" found that most teachers in ordinary level secondary schools in Iringa Municipality had not received in-service training to support the transition to a competency-based curriculum. Consequently, many teachers continued to rely on traditional teaching methods. Kennedy (2016) notes that gaps in PCK can lead to resistance when teachers are required to adopt new instructional methods, including competency-based models.The study by Kafu, (2011) on "Teacher education in Kenya: Emerging issues on emerging issues" in the context of Kenyan curriculum reform underscores the importance of teachers adapting their instructional strategies to align with the objectives of the Competency-Based Curriculum (CBC). His study demonstrates that PCK empowers teachers to gain a deep understanding of content, make informed choices about instructional methods, and create an inclusive learning environment. This focus on PCK is particularly critical for CBC implementation, as the curriculum emphasizes learner-centered methodologies.

Enhancement of facilitation Effectiveness: PCK integrates a teacher's understanding of the subject matter with effective teaching strategies tailored to that content. This blend allows teachers to deliver information in more accessible and engaging formats for students. The research conducted by Muchira et al. (2023) "Implementing Competency-Based Curriculum (CBC) in Kenya" highlights the crucial role of teachers' Pedagogical Content Knowledge (PCK) in effectively implementing Kenya's Competency-Based Curriculum (CBC).

Key findings suggest that teachers with strong PCK are better positioned to develop engaging educational experiences that align with CBC objectives, fostering essential skills like critical thinking and creativity in students. The research also points out challenges such as inadequate teacher training and inconsistent pedagogical strategies, which hinder effective implementation. As Shulman (1986) noted, PCK is critical for helping teachers convey complex ideas and respond effectively to students' questions and misunderstandings.

Improvement of Student Learning Outcomes: Research indicates that teachers with strong PCK can significantly improve student learning outcomes. For instance, a study by Park and Oliver (2008) "Revisiting the conceptualization of pedagogical content knowledge (PCK): PCK as a conceptual tool to understand teachers as professionals" found that when teachers possess deep content knowledge along with effective pedagogical strategies, learners are better equipped to understand and retain the information.The study by Jensen (2020) on "the impact of pedagogical content knowledge on student learning outcomes in a competency-based curriculum" found that teachers with strong PCK can better facilitate student engagement and understanding. These findings concur with those of Zhang and Wang (2021) drawing from their study on the relationship between teachers' pedagogical content knowledge and students' learning outcomes: Evidence from a Chinese context. Several studies; Van der Want and Verloop, 2022; Chai and Koh,2021; Nekvapil and Štefanik ,2020) report that teachers who effectively apply their PCK contribute significantly to improved student learning outcomes.

Addressinglearnermisconceptions: PCK enables teachers to anticipate and address common misconceptions that learners may have about a subject. By understanding where learners typically struggle, teachers can design lessons that proactively tackle these areas. This aspect of PCK is crucial for fostering a deeper conceptual understanding among learners, as outlined by Magnusson et al, (1999).A study by Wambua and Waweru (2019)

on "Teachers' knowledge of competency-based curriculum: Challenges in addressing misconceptions" reveals that teachers' inadequate understanding of the Competency-Based Curriculum (CBC) greatly hinders their ability to effectively address students' misconceptions. The authors stress the necessity for comprehensive training programs that equip educators with essential skills to identify and correct these misconceptions in the classroom. This finding aligns with research by Momanyi and Rop (2019), which also points to the critical role of teacher training in facilitating successful CBC implementation.Hernández and Darling-Hammond (2019) highlighted that robust Pedagogical Content Knowledge (PCK) allows teachers to design tailored learning experiences that effectively tackle students' misconceptions. This approach fosters a deeper comprehension and mastery of the competencies outlined in the Competency-Based Curriculum (CBC). Akyeampong et al. (2018) found that teachers' PCK significantly influences their ability to address student misconceptions, suggesting that enhancing teachers' understanding of content and pedagogical strategies can impact positively on student outcomes in CBC contexts. The study by Mutsune, (2014) on "Teacher pedagogical content knowledge and the teaching of mathematics in Kenya's secondary schools: A case of selected schools in Nairobi and Machakos Counties" found that limited PCK hinders teachers' ability to address common student misconceptions and adapt content effectively.

Encourages Reflective Practice: Reflective practices are essential for teachers as they enable continuous growth and development by encouraging them to critically analyze their teaching methods, student interactions, and overall classroom dynamics. Reflective practice involves a cycle of self-observation, self-evaluation, and adjustments to improve teaching and learning outcomes.Applying PCK encourages educators to reflect on their teaching approaches and tailor them to their understanding of the content and the needs of their students. Reflective practice, as described by Brookfield (2017), allows educators to critically analyze their approaches and make informed adjustments, leading to continuous improvement in teaching effectiveness. Hernández and Darling-Hammond (2019) emphasize that when teachers leverage their Pedagogical Content Knowledge (PCK) through reflective practice, they can create learning experiences that engage learners more effectively. This approach fosters a deeper comprehension of the competencies outlined in the Competency-Based Curriculum (CBC). Through critical analysis of their teaching methods, educators can adapt their instruction to more effectively meet learner' needs, thereby improving learning outcomes (Yost et al., 2000; Bullough, 2001). Bullough (2001) emphasizes that strong Pedagogical Content Knowledge (PCK) enables teachers to reflect thoughtfully on their instructional choices, equipping them to create personalized and impactful learning experiences. Additionally, Yost and Forlenza-Bailey (2000) emphasize that reflective practitioners analyze various aspects of their teaching, including student work and prior knowledge, which is crucial for addressing misconceptions and improving overall student engagement.

Builds Collaborative Learning Environments: When teachers share insights about their PCK, they contribute to a collaborative learning environment among peers. This sharing fosters a culture of learning within schools, where educators can exchange ideas and strategies related to specific subject areas, thereby enhancing overall teaching quality (Vescio, Ross, & Adams, 2008). Participating in Communities of Practice (CoP) enables teachers to reflect collaboratively on their Pedagogical Content Knowledge (PCK), fostering both individual and collective advancements in instructional practices. This collective reflection is crucial for the successful implementation of the CBC as it encourages collaborative learning among educators (Shulman, 1986; Patton & Parker, 2017). Through participation in Communities of Practice (CoP), teachers can share knowledge, exchange effective strategies, and collaboratively tackle challenges, which enhances their capacity to meet the varied needs of their students within the Competency-Based Curriculum (CBC) framework. KICD (2019) underscores the importance of PCK in creating collaborative and inclusive learning environments under CBC. The guidelines stress the necessity for teachers to modify their instructional approaches and promote cooperative learning, which is a fundamental aspect of CBC.

Lesson Planning- designing lessons that integrate appropriate pedagogical strategies tailored to the subject matter is crucial in the learning process. Research indicates that teachers' PCK significantly influences their lesson planning, enabling them to create more effective and engaging learning experiences. For instance, teachers with robust PCK can better anticipate learners' misconceptions and design lessons that address these challenges, leading to improved learning outcomes (Shulman, 1986; Li et al., 2021). Hannah (2024)highlights the need for lessons to actively engage students through hands-on activities, discussions, and real-world applications. Students who are actively engaged are more inclined to develop a more profound grasp of the content and the competencies. Research by Muasya and Waweru (2019) on "the obstacles to the successful implementation of the Competency-Based Curriculum in Kenya" revealed that teachers were insufficiently prepared for the curriculum's rollout.

Adaptation of Content- to make complex concepts accessible to learners. For example, a teacher might use visual aids, manipulatives, or relatable examples to clarify the concept for diverse learners. Van & Berry (2012) stresses that continuous professional learning can enhance teachers' abilities to adapt content for diverse classroom settings. In their study on "Effects of pedagogical content knowledge on students' achievement in Kiswahili composition in public secondary schools in Nakuru County, Kenya"Kamau&Ogoti, (2017) found that

teachers with stronger PCK are better at modifying content to address language challenges and enhance students' writing skills.Schwab and Dustin (2020) investigated the incorporation of project-based learning (PBL) as a method for adapting content within competency-based education. Their research demonstrates that PBL effectively aligns content with real-world applications, motivating students to interact with curriculum materials that foster critical thinking and collaborative skills.A study by Huang and Chen (2021) "The role of pedagogical content knowledge in adapting science curriculum to competency-based education: Insights from teachers" indicates that strong PCK enhances teachers' abilities to integrate inquiry-based approaches, which are essential for effective content adaptation in competency-based settings. Gikandi and Muthoni (2023) study "Teacher pedagogical content knowledge and its influence on content adaptation in Kenya's competency-based curriculum" explored how Kenyan teachers utilize their Pedagogical Content Knowledge (PCK) to adapt instructional content while implementing the Competency-Based Curriculum (CBC). Their findings indicate that a strong grasp of both the subject matter and teaching strategies allows teachers to design more engaging and effective learning experiences that address the diverse needs of their learners.

Use of authentic assessments- this involves creation of formative assessments that align with learning outcomes, to gauge learners progress and inform instruction. Momanyi and Rop's (2019) survey of early grade primary school teachers in Bomet East Sub-County revealed that most teachers face challenges in designing and preparing assessments aligned with the CBC.The study by Muthui, &Githua (2015) on "Influence of teachers' pedagogical content knowledge on assessment practices in mathematics: A case of public secondary schools in Nairobi County, Kenya" found that teachers with higher PCK are more competent at designing assessments that capture students' understanding of mathematical concepts, going beyond rote testing to assess comprehension and application skills. A study on the relationship between teachers' pedagogical content knowledge and assessment practices in primary schools in Kisumu County, Kenya by Ochieng&Bwire (2017) indicate that teachers with strong PCK create assessments that are more diagnostic and formative, allowing them to address students' misconceptions and adjust instruction to improve learning outcomes. Muriithi and Muthoni (2022) investigated the "relationship between teachers' PCK and their ability to implement authentic assessments in CBC in Kenyan primary schools". Their findings indicate that teachers with a robust PCK are more skilled at creating and implementing assessments that align with real-world scenarios and demonstrate relevant competencies. Otieno&Okoth (2021) in their study on influence of teachers' pedagogical content knowledge on assessment in the Competency-Based Curriculum in Kenya found that teachers with strong PCK adapt assessments to evaluate competencies, skills, and knowledge, aligning assessments with the CBC's emphasis on practical and holistic evaluation of learners.Njoroge and Njuguna (2020) carried out a study on the influence of teachers' pedagogical content knowledge (PCK) on assessment practices in teaching Kiswahili grammar in public primary schools in Kenya. Their findings reveal that teachers who possess a strong PCK in Kiswahili modify assessment tasks to evaluate not only grammar recall but also the practical use of the language, thereby enhancing students' overall language proficiency.

Promote inclusivity in learning:by utilizing differentiated instruction to address the diverse needs of students. Thismay include offering varied assignments, grouping students by skill level, or providing g additional resources for students who need extra support.Tomlinson's (2014) research on "The differentiated classroom: Responding to the needs of all learners" underscores the importance of adjusting teaching methods to accommodate various learning styles, abilities, and backgrounds, closely aligning with the role of Pedagogical Content Knowledge (PCK) in supporting inclusive learning environments. Tomlinson argues that teachers' grasp of both content and pedagogy is crucial in establishing classrooms where every student has the opportunity to thrive.

A study by Mugo et al (2016) on "Pedagogical Content Knowledge and inclusive teaching practices in Nakuru County, Kenya" found that teachers with higher PCK are better equipped to modify instructional methods to meet diverse student needs, including those with disabilities, thus making content accessible and understandable. Kenya Institute of Curriculum Development, (2019) guidelines for implementing the CBC in Kenya emphasize the crucial role of Pedagogical Content Knowledge (PCK) in effective curriculum delivery. KICD stresses that teachers need to adapt content to meet diverse student needs, a goal achievable through strong PCK. This emphasis is reflected in the training materials and instructional resources designed to strengthen teachers' PCK for CBC implementation.

Ndung'u and Kathuri(2018) study on" Influence of teachers' pedagogical knowledge on the implementation of inclusive education in primary schools in Nairobi County, Kenya" established that teachers with strong PCK use differentiated instruction and adaptive teaching methods, which enhance inclusivity for students with diverse learning abilities. Research finding by Mwangi&Kimosop, (2020) in their study on "the role of pedagogical content knowledge in promoting inclusive science education in secondary schools in Laikipia County, Kenya" show that teachers with strong PCK use practical adaptations, such as simplified language and visual aids, to make science content accessible to all students, including those with special educational needs. Gatimu, &Waweru (2021) study on "Impact of teachers' pedagogical content knowledge on

inclusive classroom practices on special needs programs in public schools in Kenya" reveals that teachers who possess advanced PCK are more proficient in implementing individualized teaching methods, facilitating a more inclusive learning environment for students with varied needs.

Integration of Technology - to enhance content delivery and engagement. For instance, using simulations to help students visualize complex concepts.Mishra and Koehler (2006) foundational study titled, "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge" introduced Technological Pedagogical Content Knowledge (TPACK) describing how teachers' integration of technology calls for a deep understanding of both disciplinary knowledge and pedagogical techniques." Findings by Muli, and Orodho (2022) in the study "Exploring the influence of teachers' pedagogical content knowledge on technology integration in the implementation of the competency-based curriculum in Kenyan secondary schools" emphasize that teachers with strong PCK are more capable of choosing and utilizing suitable technological tools that improve student learning and foster engagement. Koech and Orodho (2023) investigating on how teachers' Pedagogical Content Knowledge (PCK) contributes to the integration of digital technologies in CBC classrooms reveals that successful integration necessitates not only familiarity with technology but also pedagogical understanding of how to effectively employ it to enhance learning outcomes. Erdogan and Nartgun (2021) conducted an analysis on how teachers' Pedagogical Content Knowledge (PCK) affects the effective integration of technology in competency-based education. Their findings indicate that teachers who possess strong skills in both subject matter and teaching methods are more inclined to utilize technology effectively to improve students' learning experiences.

A study by Mwanza and Meere (2021) on "the Challenges of Integrating Technology in the Kenyan Classroom" found that teachers had low confidence in their digital skills, particularly when using technology in instructional settings. The study noted that teachers who lack digital literacy feel unprepared to incorporate ICT into their lessons, impacting their ability to support student learning effectively. In addition, many schools face challenges in maintaining digital equipment and lack timely technical support when issues arise resulting to broken or malfunctioning devices that cannot be used regularly, thus disrupting the continuity of technology-based learning activities. Teachers experience difficulty in aligning digital tools with the prescribed curriculum content and objectives. This misalignment limits the pedagogical benefits of technology in classrooms.Owala (2021) points out that a significant barrier to effectively implementing the competency-based curriculum is the widespread lack of ICT skills among teachers, many of whom face difficulties incorporating technology into this framework. Similarly, Ouma and Mwakapenda's (2019) study on "Teacher Preparedness for Digital Literacy Integration in Teaching and Learning" found that numerous teachers reported limited digital competence, which hampered their ability to effectively use technology in their instructional practices. This lack of confidence and skills often resulted in resistance toward adopting digital tools.

II. Conclusion

The effective implementation of the Competency-Based Curriculum (CBC) in Kenyan schools is strongly linked to teachers' PCK. As educators address the challenges posed by diverse classroom environments, their ability to integrate substantial subject matter expertise with effective teaching strategies becomes essential. This paper illustrates that Pedagogical Content Knowledge (PCK) enables teachers to customize their instructional methods to address different learning styles while also enhancing their capacity to foster critical thinking, creativity, and problem-solving abilities in students. PCK is crucial for effective teaching, as it empowers educators to combine their subject knowledge with suitable teaching strategies to support student learning.Understanding the connection between these factors enables teachers to create more effective and engaging learning environments that cater to the diverse needs of their students. Incorporating PCK) within their subject areas enables teachers to boost their effectiveness, enhance student learning, and participate in meaningful professional development. The interplay of content knowledge and pedagogy is essential for fostering a rich learning environment and addressing the diverse needs of students.

The paper stresses the urgent necessity for focused professional development programs designed to furnish teachers with the PCK needed to effectively implement the CBC. Investment in teacher training, provisions of learning resources, mentorship, and continuous support is vital for creating a sustainable educational environment where both teachers and learners can excel.

Ultimately, enhancing teachers' PCK will not only facilitate the effective implementation of the CBC but also elevate the overall quality of education in Kenya, equipping learners to face the challenges of an ever-evolving world. As the nation works to achieve its educational objectives, fostering a thorough understanding of PCK among teachers will be crucial in cultivating a generation of capable, innovative, and engaged learners.

III. Recommendations

1) The government should embark on strategic approach to teacher development which is aligned with the broader goals of the educational system and takes into account the specific needs of teachers and learners to enhance teachers' professional skills. Engaging in workshops and training sessions tailored to specific subjects can help teachers deepen their content knowledge and learn effective teaching strategies.
2) Team workamong colleagues to share experiences and teaching practices can enhance PCK. Collaborative planning sessions and peer observations offer significant benefits.
3) Integrating technology into teaching can significantly enhance teachers' Pedagogical Content Knowledge (PCK). Utilizing online platforms and digital tools allows educators to access a diverse range of resources, such as instructional videos, interactive simulations, and collaborative tools, which can enrich their facilitation practices.
4) Motivating teachers to engage in action research allows them to explore and enhance their teaching practices thereby enhancing their Pedagogical Content Knowledge (PCK) through reflective inquiry. This process fosters a culture of continuous learning and adaptation, allowing educators to identify effective strategies and address challenges in their classrooms.
5) Mentorship and coaching which involves pairing less experienced teachers with mentors or coaches to offer personalized support that enhances their Pedagogical Content Knowledge (PCK). This relationship not only facilitates the sharing of effective teaching strategies but also fosters a reflective practice environment where novice teachers can grow in confidence and skill.
6) Encouraging teachers to assess their teaching methods helps them identify areas for improvement and develop more effective instructional strategies. By engaging in reflective practices, teachers can identify strengths and weaknesses in their approaches, leading to enhanced pedagogical effectiveness and student outcomes.
7) The government should prioritize efficient resource allocation, guaranteeing that teachers have access to teaching resources, technology, and professional development opportunities to help them enhance their Pedagogical Content Knowledge (PCK). Resources enable teachers to explore innovative teaching methods, adapt to different learning styles, and implement best practices
8) To address any resistance, administrators should provide a platform for addressing questions and concerns to foster an inclusive atmosphere where stakeholders feel valued and heard.

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