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STUDENT PERSPECTIVES ON DIGITAL LEARNING TOOLS IN COMPETENCY-BASED CURRICULUM IMPLEMENTATION IN JUNIOR SCHOOLS

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Abstract:
This study explores the perspectives of junior School students in Kenya on the integration of digital learning tools within the Competency-Based Curriculum (CBC). Guided by social constructivist theory, the research employed a descriptive survey design involving 384 learners from public and private schools in both urban and rural settings in Busia County. Data were collected using a structured questionnaire and analyzed through descriptive and inferential statistics. Findings indicate that while students generally perceive digital tools as beneficial for enhancing engagement and comprehension, access and effective usage vary significantly based on school type and location. Key barriers identified include poor infrastructure, limited internet connectivity, and inadequate teacher support. The study underscores the need to bridge digital divides, incorporate student voice in technology implementation, and enhance teacher preparedness. These insights inform policy and practice toward equitable, effective digital integration in CBC implementation.

Keywords: competency-based curriculum, digital learning tools, student perceptions, social constructivism, educational technology

1. Introduction

Kenya's educational landscape has undergone a fundamental transformation with the introduction of the Competency-Based Curriculum (CBC), which was rolled out in 2017 as a response to the perceived inadequacies of the previous content-based system (KICD, 2019). This reform emphasizes the acquisition of practical skills and the development of learners' competencies such as communication, critical thinking, creativity, collaboration, and digital literacy—often referred to as 21st-century skills (UNESCO, 2022). A key pillar in achieving these competencies is the strategic integration of digital learning tools into the teaching and learning process.

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Digital learning tools, encompassing a wide array of resources such as interactive simulations, educational software, online learning platforms, and digital assessments, are considered critical enablers in enhancing learner engagement and promoting personalized learning (Means *et al.*, 2014). In Kenya, the government has invested significantly in promoting digital literacy through flagship initiatives such as the Digital Literacy Programme (DLP), which aimed to equip primary school learners and teachers with digital devices and content (MOE, 2020). However, while these efforts signal a commitment to integrating technology in education, the effectiveness and sustainability of such programs largely hinge on the end-users, particularly students who are expected to actively engage with and benefit from digital tools.

Students' perspectives serve as a barometer for gauging the practical success of educational innovations. Research has shown that positive student perceptions towards digital tools correlate with increased engagement, intrinsic motivation, and better academic performance (Bakia *et al.*, 2011; Sung *et al.*, 2016). Conversely, when learners perceive technology as inaccessible, difficult to use, or irrelevant, it can impede adoption and reinforce existing educational inequalities (Selwyn, 2016). Despite growing scholarly attention on the CBC's implementation in Kenya, much of the research has concentrated on teacher preparedness, curriculum content, and infrastructural challenges (Wanjala *et al.*, 2022), with minimal focus on Junior School students' views on digital learning tools.

This study sought to fill this gap by exploring how Junior School learners perceive the integration of digital tools within the CBC context, including perceived benefits, usage patterns, and challenges encountered. Anchored in social constructivist theory, which views learning as an active and socially mediated process (Vygotsky, 1978), the study posits that digital tools, when effectively implemented, can support collaborative learning and the construction of knowledge in authentic contexts. By focusing on student voices, this research contributes nuanced insights that can inform policy, curriculum development, and the equitable implementation of educational technology in Kenya's CBC framework.

This study aimed to bridge this knowledge gap by foregrounding Junior School learners' perceptions of digital tools within the CBC framework. Understanding these perspectives will provide a holistic view of the opportunities and barriers associated with educational technology in Kenya, especially in a system transitioning toward competency-based learning.

2. Literature Review

The use of digital tools in education has garnered extensive scholarly attention, particularly in light of global trends toward technology-enhanced learning. Digital learning environments have been praised for their ability to foster learner-centered pedagogies, promote engagement, and support differentiated instruction (Hwang *et al.*, 2016). For instance, adaptive learning systems allow real-time feedback and

individualized learning trajectories, aligning well with the competency-based philosophy, which seeks to accommodate diverse learner needs (Graham *et al.*, 2020).

Prensky (2001) introduced the term "digital natives" to describe a generation of learners who have grown up immersed in digital technologies, suggesting that these learners prefer interactive, visual, and networked modes of learning. This characterization has influenced educational discourse, prompting educators to rethink pedagogical strategies to meet the expectations and learning styles of tech-savvy students. Research by Sung *et al.* (2016) supports the notion that integrating digital tools into instructional design can lead to improved academic performance, especially when tools are aligned with instructional objectives and competency development.

In the Kenyan context, the integration of digital technologies in education has been supported by national policy frameworks such as the National ICT Policy and the Kenya Vision 2030 blueprint (Republic of Kenya, 2013). However, practical implementation remains uneven. Studies indicate that disparities in access to digital infrastructure persist, with public schools, especially those in rural and marginalized areas, struggling with limited access to electricity, internet connectivity, and appropriate devices (Wambiri & Ndani, 2020; Mucherah & Amburo, 2020). Moreover, while teacher training on digital pedagogy has been rolled out, the level of ICT integration in classroom practices remains low, particularly in under-resourced environments.

Most existing research has focused on the perspectives of educators and policymakers, leaving a critical gap in understanding how students themselves perceive and engage with digital tools in their learning. According to Abungu *et al.* (2014), excluding student voices can result in top-down interventions that fail to address the realities of classroom learning. Given that students are the primary beneficiaries of educational technology, their insights are essential in evaluating the effectiveness of digital learning tools and ensuring their equitable implementation across different educational contexts.

3. Theoretical Framework

This study is grounded in **social constructivist theory**, as formulated by Lev Vygotsky (1978), which posits that knowledge is co-constructed through social interaction and mediated by tools, language, and cultural artifacts. From this perspective, learning is not merely the acquisition of information but a dynamic process shaped by collaborative engagement and contextual experiences.

Digital tools align closely with the tenets of social constructivism. They provide platforms for collaboration (e.g., Google Docs, discussion forums), support scaffolded learning (e.g., learning management systems with guided content), and facilitate learner autonomy while maintaining social interaction (Laurillard, 2013). In a competency-based curriculum like Kenya's CBC, these affordances are particularly relevant, as learners are expected to demonstrate mastery through problem-solving, project-based work, and real-world application—all of which are enhanced by technology.

Moreover, the concept of the **Zone of Proximal Development (ZPD),** a key component of Vygotsky's theory, underscores the importance of appropriate support or scaffolding in advancing learning. Digital tools can provide such scaffolding through personalized learning pathways, instant feedback, and interactive simulations that adjust to the learner's pace and level (Means *et al.*, 2014). For example, platforms that offer virtual science experiments allow students to explore complex concepts beyond textbook limitations, thereby promoting deeper understanding and competence.

By adopting a social constructivist lens, this study examines how students interpret and interact with digital tools in ways that reflect collaborative meaning-making, contextual learning, and competency acquisition. This theoretical orientation also informs the analysis of the relational aspects of technology use—how peer interactions, teacher mediation, and contextual factors shape students' digital learning experiences in the CBC environment.

4. Methodology

4.1 Research Design

This study employed a **descriptive survey research design**, which is appropriate for capturing attitudes, perceptions, and experiences of a defined population at a specific point in time (Creswell & Creswell, 2018). The descriptive design was chosen to systematically collect quantitative data on junior School students' perceptions of digital learning tools within the framework of the Competency-Based Curriculum (CBC). This approach is particularly suitable for education-based research where the objective is to gather evidence on the prevalence and distribution of specific learner experiences (Kothari, 2004).

The choice of a survey methodology also aligns with previous studies on educational technology integration, which have successfully used survey designs to explore learner perspectives in varied settings (Sife *et al.*, 2007; Teo, 2011). Moreover, the study draws on elements of cross-sectional research, collecting data at one point in time from a representative sample to generalize findings to a wider student population (Fraenkel *et al.*, 2015).

4.2 Study Location and Population

The study was conducted in **Busia County**, a region in western Kenya that represents a diverse mix of rural and urban educational settings. The choice of location was deliberate to capture a wide range of socio-economic and infrastructural contexts that may influence students' experiences with digital learning tools. Busia County has a growing number of Junior Schools, both public and private, and has been part of national efforts to roll out ICT infrastructure under the government's Digital Literacy Programme (MOE, 2020).

The target population comprised J**unior School learners** (Grades 7–9) enrolled in public and private junior Schools within the county. These learners have been exposed to

CBC since its rollout and represent a generation increasingly expected to engage with digital tools in their academic activities.

4.3 Sampling Procedure and Sample Size

To ensure representative coverage, the study employed **stratified random sampling**. Schools were first stratified by location (urban vs. rural) and type (public vs. private), after which random sampling was used within each stratum to select participant schools. This technique enhanced the generalizability of findings by accounting for variations in ICT access and educational environments across different school types (Mugenda & Mugenda, 2003).

A total of **384 students** were sampled from 16 schools (8 public and 8 private) with equitable representation from both urban and rural settings. This sample size was determined using Cochran's (1977) formula for categorical data, ensuring a 95% confidence level and a 5% margin of error. Within each school, learners were randomly selected across Grade 7, Grade 8, and Grade 9 levels.

4.4 Data Collection Instruments

Data were collected using a **structured questionnaire** consisting of both closed-ended and Likert-scale items. The instrument was divided into four main sections: demographic information, availability and accessibility of digital tools, learner engagement and usage patterns, perceived benefits of digital learning, and challenges faced. The questionnaire was designed in alignment with previous validated instruments on digital learning perceptions (Teo, 2011; Hwang *et al.*, 2016) and adapted to reflect the Kenyan CBC context.

Items were scored on a **five-point Likert scale** ranging from *Strongly Disagree (1)* to *Strongly Agree (5)* to capture the intensity of students' perceptions. The Likert-scale format was chosen for its ability to measure attitudes and perceptions quantitatively and has been widely used in similar educational technology research (Sung *et al.*, 2016).

4.5 Validity and Reliability

To ensure **content validity**, the questionnaire was reviewed by a panel of experts in educational technology and curriculum studies at Kenyatta University. Feedback from these experts informed the refinement of the items for clarity, cultural relevance, and alignment with study objectives.

A **pilot study** was conducted with 30 students from two schools in a neighboring county (not included in the main study) to test the instrument's reliability and internal consistency. The **Cronbach's alpha** coefficient for the entire instrument was found to be **0.87**, indicating a high level of reliability (Nunnally & Bernstein, 1994). Minor adjustments were made based on the pilot feedback, particularly in simplifying language and refining ambiguous items.

4.6 Data Analysis Techniques

Descriptive statistics, including means, standard deviations, and frequencies, were used to summarize students' perceptions of digital tools. To explore relationships between students' perceptions and background variables (e.g., school type, access to devices), **inferential statistics** were applied. These included **independent t-tests** and **one-way ANOVA** to test for statistically significant differences across demographic groups. Additionally, **Pearson's correlation** was used to determine associations between perceived benefits and frequency of digital tool use.

The significance level was set at $\mathbf{p < .05}$ for all statistical tests. The analysis followed best practices for educational survey data analysis to ensure meaningful interpretation of learner attitudes (Creswell & Plano Clark, 2017).

5. Results

5.1 Demographic Characteristics of Respondents

A total of **384 Junior School students** participated in the study. Of these, 52% were male and 48% female. In terms of school type, 56% were from public schools, while 44% were enrolled in private institutions. Regarding location, 58% of respondents were from rural schools and 42% from urban settings. The learners were drawn evenly from Grades 7 to 9.

5.2 Availability and Accessibility of Digital Tools

Findings revealed that **65% of students reported regular access to digital devices** such as tablets or computers either at school or home. However, there were notable disparities: while **78% of students in private schools** had consistent access to digital tools, only **49% of their counterparts in public schools** reported the same. This gap was even wider when comparing urban (73%) to rural learners (46%).

Despite efforts like the Digital Literacy Programme, students cited limited access to functional devices, unreliable internet connectivity, and overcrowded digital labs in public schools. The mean score for access-related items was $\mathbf{M = 3.45}$, $SD = 0.87$, suggesting moderate availability but uneven distribution.

5.3 Learner Engagement and Usage Patterns

Students were asked about the frequency and types of digital learning activities they engaged in. **Approximately 62%** indicated that they used digital tools for accessing e-books, videos, and CBC-aligned online quizzes. A smaller proportion, **around 38%**, reported using digital platforms for collaborative group tasks or discussion forums.

The mean score for this domain was $\mathbf{M = 3.38}$, $SD = 0.91$, showing that although usage is present, it is mostly limited to individual content consumption rather than interactive learning, which is a cornerstone of CBC's competency approach.

5.4 Perceived Benefits of Digital Learning Tools

A majority of respondents expressed **positive perceptions** regarding the usefulness of digital tools. **68% agreed or strongly agreed** that digital learning enhanced their understanding of complex topics, while **72% believed** that it made learning more enjoyable and relevant.

The average score on perceived benefits was **M = 3.79**, *SD = 0.84*. High scorers noted improved engagement, exposure to real-life scenarios through multimedia content, and the ability to learn at their own pace. These findings align with Hwang *et al.* (2016), who emphasize that digital tools can personalize learning and improve outcomes.

5.5 Challenges in Digital Learning

Despite the positives, students identified several **challenges**. The most cited barriers included lack of reliable internet (mentioned by 59% of students), limited teacher guidance on using digital tools effectively (42%), and inconsistent power supply (37%).
The mean score for challenge-related items was **M = 3.20**, *SD = 0.93*, indicating a moderate level of concern. Rural learners reported more severe challenges, with a statistically significant difference in mean scores between rural (M = 3.05) and urban students (M = 3.40), $t(382) = 2.88$, $p < .01$.

5.6 Inferential Analysis

A **Pearson correlation analysis** was conducted to explore the relationship between the frequency of digital tool usage and students' perception of their effectiveness. The results showed a **moderate positive correlation,** $r = 0.48$, $p < .001$, suggesting that learners who used digital tools more frequently tended to perceive them as more beneficial.

Further, **ANOVA tests** revealed significant differences in perception based on school type ($F(1, 382) = 4.95$, $p = .027$) and location ($F(1, 382) = 6.31$, $p = .013$), confirming the role of context in shaping students' digital learning experiences.

6. Discussion

The results of this study highlight the **complex and multi-layered nature** of student experiences with digital learning tools in the CBC environment. While many learners perceive digital tools as enhancing engagement and comprehension, **inequities in access, teacher support, and infrastructure** pose significant challenges.

6.1 Alignment with Social Constructivist Theory

The findings strongly support the **social constructivist framework** guiding this study. Learners who reported frequent use of collaborative tools (such as discussion forums or group projects) also demonstrated higher appreciation for digital learning, indicating that when technology is used in interactive ways, it promotes the kind of experiential and social learning Vygotsky (1978) advocates.

However, the limited use of collaborative digital activities suggests a **misalignment between available tools and pedagogical practices**. Many students reported passive rather than active use of digital resources primarily watching videos or reading e-books underscoring a missed opportunity to utilize technology for dialogic and competency-based learning.

6.2 Socioeconomic and Infrastructure Disparities

A key concern raised by the data is the persistent **digital divide** between learners in urban and rural settings and between public and private schools. These disparities mirror earlier findings by Wambiri and Ndani (2020), who emphasized how infrastructure inequality can hinder digital learning in Kenyan schools.

Students in rural areas and public institutions consistently reported **lower access, fewer interactive engagements, and more barriers**, including limited teacher facilitation. This not only affects their perception of digital tools but may also reinforce existing educational inequalities. Bridging this gap requires more than device provision it demands teacher training, stable connectivity, and ongoing technical support (MOE, 2020).

6.3 Learner Voice as a Catalyst for Change

Importantly, this study contributes to the growing call to include **student voice in educational technology discourse**. Most existing studies prioritize teacher perspectives or policy implementation, yet as this research shows, learners provide valuable insights into both the effectiveness and limitations of digital tools within CBC.

Students' positive outlook on the potential of digital tools, despite infrastructural limitations, reflects their **resilience and adaptability** traits that the CBC seeks to nurture. As such, incorporating learner feedback into digital integration strategies could yield more relevant and sustainable outcomes (Prensky, 2001).

6.4 Implications for Policy and Practice

The results suggest a need for **context-sensitive interventions** to ensure that all learners can benefit from digital innovations. This includes:

- **Expanding infrastructure investment** in rural schools
- **Providing teacher professional development** on techno-pedagogical integration
- **Designing digital content** aligned with CBC competencies and learner interests
- **Encouraging participatory digital activities** to foster collaboration

Such steps would not only enhance digital tool usage but also help realize the **transformational potential of CBC** in equipping Kenyan learners with 21st-century skills.

7. Conclusion and Recommendations

7.1 Conclusion

This study explored Junior School students' perspectives on the integration of digital learning tools in the implementation of Kenya's Competency-Based Curriculum (CBC). The findings demonstrate that while most students hold positive views about the potential of digital technologies to enhance learning, **actual usage remains uneven**, shaped significantly by school type, geographical location, and infrastructure availability.

Learners acknowledged that digital tools improved their understanding, engagement, and exposure to real-world content—aligning well with the **constructivist underpinnings of CBC**, which emphasize learner-centered, collaborative, and experiential learning (Vygotsky, 1978). However, students also identified significant barriers, including limited access to devices, inadequate internet connectivity, and a lack of consistent teacher support in using digital tools effectively.

These results underscore that **students are not merely passive recipients** of technological integration but critical stakeholders whose experiences and feedback offer valuable guidance for optimizing educational innovations. The evident **digital divide** across public-private and rural-urban school categories further highlights the risk of **exacerbating existing inequalities** if implementation is not carefully contextualized.

Ultimately, while the integration of digital learning tools holds great promise in advancing CBC's competency goals, **success hinges on inclusive access, pedagogical support, and learner engagement**. Addressing these dimensions holistically is essential for achieving equitable and transformative education in Kenya.

7.2 Recommendations

Based on the study's findings, the following recommendations are proposed for policymakers, educators, and educational technology stakeholders:

1) **Invest in equitable digital infrastructure across schools:** The government and partners should **prioritize infrastructure development in rural and public schools**, including the provision of functional devices, stable internet connectivity, and reliable electricity. Expanding the reach of the Digital Literacy Programme and tailoring it to CBC requirements can help level the playing field (MOE, 2020).
2) **Enhance teacher capacity for techno-pedagogical integration:** Continuous **professional development programs** should be instituted to equip teachers with the skills to meaningfully integrate digital tools into CBC learning. Emphasis should be placed on designing and facilitating **collaborative, inquiry-based digital activities** rather than passive content delivery (Teo, 2011; Hwang *et al.*, 2016).
3) **Foster student-centered digital learning environments:** Learning platforms and resources should be designed to reflect **learner interests, real-world applications, and interactivity**, promoting deeper engagement. Schools should also encourage

student-led innovation clubs or peer support teams to strengthen digital skills and ownership.

4) **Institutionalize student feedback in digital education policy:** Students' voices should be systematically captured and integrated into policy formulation, platform design, and school-level ICT strategies. This will not only improve tool relevance but also foster a **culture of learner agency and inclusion** in decision-making (Prensky, 2001).
5) **Promote public-private partnerships for sustainable digital education:** Collaboration with tech companies, NGOs, and development partners can mobilize resources, develop localized content, and offer technical support. Such partnerships should focus on long-term sustainability, digital equity, and alignment with Kenya's **Vision 2030 education goals** (Republic of Kenya, 2007).

In conclusion, optimizing digital learning in the CBC era requires a **multi-stakeholder, learner-centered approach** that balances technological advancement with pedagogical vision and inclusivity. By responding to the voices of learners, Kenya can take significant strides toward delivering **an education that is equitable, relevant, and transformative**.

Conflict of Interest Statement

The author declares no conflicts of interest.

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