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## Competency mapping of creative arts trainers: Identifying professional development priorities for CBC implementation in Kenya's education sector

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### Abstract

**Background:** Kenya's Competency-Based Curriculum (CBC), introduced in 2017, represents a paradigm shift from content-based to learner-centered education, emphasizing practical skills and creativity. Creative arts subjects—including music, art and craft, and physical education—form critical pillars of this reform, yet their effective implementation depends heavily on teacher competencies that remain largely unmapped. Current evidence suggests significant gaps between required competencies and existing trainer capabilities, potentially undermining CBC's transformative objectives.

**Objective:** This study aimed to systematically map the competencies of creative arts trainers in Kenya's basic education sector and identify priority areas for professional development to support effective CBC implementation.

**Methods:** A cross-sectional survey design was employed involving 384 creative arts trainers from 47 counties in Kenya. Data were collected using a validated competency assessment instrument measuring pedagogical knowledge, subject content mastery, technological integration, and CBC-specific skills. Competency gaps were analyzed using weighted gap analysis and importance-performance matrix techniques.

**Results:** Results revealed critical competency gaps in learner assessment (mean gap score: 2.34/5), technological integration (2.18/5), and differentiated instruction (2.05/5). Only 23% of trainers demonstrated proficient competency levels across all CBC-required domains. Significant variations existed across geographic regions, with urban trainers outperforming rural counterparts by 34%. Priority development needs included formative assessment techniques, digital literacy for arts education, and inclusive pedagogy.

**Conclusions:** The study provides empirical evidence for targeted professional development interventions. Addressing identified competency gaps through structured capacity-building programs is essential for realizing CBC's creative arts objectives and ensuring equitable quality education across Kenya's diverse educational landscape.

**Keywords:** Competency mapping; Creative arts education; Competency-Based Curriculum; Teacher professional development; Pedagogical competencies; Curriculum implementation; Kenya education sector

### 1. Introduction

The transformation of educational systems worldwide reflects an evolving understanding of 21st-century learning requirements, where creativity, critical thinking, and practical competencies supersede rote memorization and content reproduction (Scott, 2015). Creative arts education—encompassing visual arts, music, drama, and movement—has emerged as a fundamental vehicle for developing these competencies, fostering not merely artistic skills but broader

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cognitive, social, and emotional capabilities essential for holistic learner development (Winner, Goldstein, & Vincent-Lancrin, 2013). Yet the realization of creative arts education's transformative potential hinges critically upon teacher competencies, which remain inadequately understood, particularly in contexts undergoing significant curriculum reforms.

Kenya's educational landscape has witnessed profound transformation through the introduction of the Competency-Based Curriculum (CBC) in 2017, replacing the decades-old 8-4-4 system that had been criticized for its examination-oriented approach and limited emphasis on practical skills (Ministry of Education, 2017). The CBC framework explicitly positions creative arts as core rather than peripheral subjects, recognizing their contribution to developing learners' innovation, cultural identity, and self-expression. This curricular repositioning, however, has exposed critical gaps in teacher preparedness, infrastructure, and pedagogical approaches—gaps that threaten to undermine the reform's ambitious objectives.

Globally, competency-based education reforms have demonstrated that curriculum change without corresponding teacher capacity development yields suboptimal outcomes (Mulder, Gulikers, Biemans, & Wesselink, 2009). International experiences from Finland, Singapore, and New Zealand reveal that successful curriculum implementation requires systematic investment in teacher professional development, particularly in subjects demanding specialized pedagogical approaches such as creative arts (Sahlberg, 2015). These lessons underscore the necessity of understanding existing teacher competencies as a foundation for designing responsive professional development interventions.

Regionally, East African countries have pursued various curriculum reforms with mixed results, often encountering implementation challenges rooted in inadequate teacher preparation (Hardman et al., 2009). Rwanda's competency-based curriculum reform, initiated in 2015, encountered significant obstacles due to teachers' limited understanding of learner-centered pedagogies and assessment approaches (Byusa, Kampire, & Mweru, 2020). Tanzania's shift toward competency-based education similarly revealed substantial gaps in teacher competencies, particularly in subjects requiring creative and experiential learning methodologies (Komba & Mwandanji, 2015). These regional experiences highlight the critical importance of competency mapping as a precursor to effective professional development programming.

Within Kenya's context, the CBC implementation has progressed through primary education levels, yet concerns persist regarding teacher readiness, particularly for creative arts subjects that historically received minimal emphasis in teacher training programs (Ondimu, 2018). The Kenya Institute of Curriculum Development (KICD) acknowledges that creative arts trainers face unique challenges, including limited resources, large class sizes, and insufficient pre-service preparation in CBC methodologies (KICD, 2019). Moreover, the rapid rollout of CBC has left many teachers struggling to transition from traditional didactic approaches to the experiential, learner-centered pedagogies that creative arts demand.

### **1.1. Problem Statement**

Despite creative arts' centralized position in Kenya's CBC framework, systematic evidence regarding trainers' competency profiles remains absent. This knowledge gap impedes the development of targeted professional development interventions, potentially perpetuating ineffective teaching practices and inequitable learning outcomes. Without empirical understanding of specific competency deficits, educational authorities and training institutions cannot efficiently allocate resources or design responsive capacity-building programs. Furthermore, the absence of competency mapping undermines efforts to establish quality assurance mechanisms and professional standards for creative arts education.

The problem is compounded by Kenya's diverse educational context, where significant variations exist between urban and rural settings, well-resourced and under-resourced schools, and trained versus untrained teachers. These contextual factors likely influence competency profiles, yet their effects remain unquantified. Additionally, the CBC's emphasis on formative assessment, differentiated instruction, and technology integration introduces new competency requirements that may exceed current trainer capabilities. Understanding these gaps is essential for ensuring that CBC implementation achieves its intended outcomes rather than reproducing existing educational inequities.

This study aimed to systematically map the competencies of creative arts trainers in Kenya's basic education sector and identify priority areas for professional development. Specific objectives included: (1) To assess creative arts trainers' current competency levels across CBC-required domains, (2) To identify significant competency gaps requiring professional development intervention, (3) To determine priority areas for capacity-building based on competency importance and performance and (4) To examine variations in competency profiles across demographic and contextual

variables. Corresponding research questions were: (1) What are the current competency levels of creative arts trainers in CBC-required domains? (2) Where do significant gaps exist between required and demonstrated competencies? (3) Which competency areas should be prioritized for professional development interventions? And (4) How do competency profiles vary across trainer demographics and school contexts?

## 1.2. Conceptual Framework

This study was guided by an integrated conceptual framework combining Competency Theory (McClelland, 1973) and the TPACK (Technological Pedagogical Content Knowledge) framework (Mishra & Koehler, 2006). Competency Theory posits that effective performance requires specific combinations of knowledge, skills, and attitudes that distinguish superior from average performers (Spencer & Spencer, 1993). Applied to creative arts education, this theory suggests that trainer effectiveness depends upon multidimensional competency clusters encompassing subject mastery, pedagogical knowledge, and contextual understanding.

The TPACK framework extends this competency conceptualization by explicitly incorporating technological knowledge as a critical component of contemporary teaching competence. TPACK recognizes that effective 21st-century pedagogy emerges from the intersection of content knowledge, pedagogical knowledge, and technological knowledge—particularly relevant for creative arts education where digital tools increasingly mediate creation, presentation, and assessment (Koehler, Mishra, & Cain, 2013). These theoretical foundations informed the study's competency domains and assessment framework, ensuring comprehensive mapping of trainer capabilities relevant to CBC implementation.

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## 2. Literature Review

### 2.1. Competency-Based Education and Curriculum Reform

Competency-based education represents a fundamental reconceptualization of educational purposes and processes, shifting focus from time-based progression and content coverage to demonstrated mastery of defined competencies (Nodine, 2016). This pedagogical approach, which gained prominence through European higher education reforms and American vocational education movements, emphasizes outcomes, flexibility, and learner agency (Gervais, 2016). Contemporary competency-based systems typically integrate knowledge, skills, and attitudes within authentic performance contexts, requiring educators to facilitate rather than transmit learning (Morcke, Dornan, & Eika, 2013).

International research demonstrates that competency-based curriculum reforms consistently encounter implementation challenges, particularly regarding teacher preparedness (Kouwenhoven, 2009). Studies from diverse contexts including Canada, Australia, and Scotland reveal that teachers often struggle with competency-based assessment approaches, requiring extensive professional development to effectively implement new curricular expectations (Harris, Jones, & Huffman, 2018). These findings underscore that curriculum documents alone cannot transform educational practice without corresponding investments in teacher capacity development.

Within African contexts, competency-based curriculum reforms have proliferated over the past two decades, driven by recognition that traditional examination-oriented systems inadequately prepare learners for contemporary labor markets and civic participation (Abdulkarim et al., 2020). However, implementation outcomes have been inconsistent, with many reforms failing to translate policy intentions into classroom realities (Vavrus, Thomas, & Bartlett, 2011). Research from Rwanda, Uganda, and Tanzania consistently identifies teacher competencies as critical determinants of reform success or failure (Schweisfurth, 2011).

### 2.2. Creative Arts Education in Curriculum Reform

Creative arts education occupies a distinctive position within educational systems, simultaneously serving instrumental purposes (cognitive development, cultural transmission) and intrinsic purposes (aesthetic experience, creative expression) (Eisner, 2002). Contemporary research demonstrates that quality creative arts instruction contributes significantly to learners' academic achievement, social-emotional development, and creative capacities (Catterall, Dumais, & Hampden-Thompson, 2012). However, realizing these benefits requires specialized pedagogical approaches that differ substantially from traditional subject instruction.

Effective creative arts pedagogy emphasizes experiential learning, process over product, differentiated instruction, and authentic assessment—characteristics that align closely with competency-based education principles (Seidel et al., 2009). Yet many teachers, particularly those without specialized training, struggle to implement these approaches, defaulting instead to teacher-centered, technique-focused instruction that undermines creative arts' developmental

potential (Oreck, 2004). International studies reveal that creative arts teachers require distinct competency profiles combining artistic expertise, pedagogical knowledge, and facilitation skills (Garvis & Pendergast, 2012).

In African educational contexts, creative arts subjects have historically occupied marginal positions, often viewed as recreational rather than academic (Nzewi, 2007). This marginalization has resulted in limited investment in creative arts teacher training, inadequate resources, and minimal curriculum time allocation (Akuno, 2014). However, recent curriculum reforms across the continent increasingly recognize creative arts' contributions to holistic development, necessitating corresponding investments in teacher competencies (Oehrli, 2020).

### **2.3. Teacher Competencies and Professional Development**

Teacher competency frameworks provide structured approaches to defining, assessing, and developing the knowledge, skills, and dispositions required for effective instruction (König et al., 2016). Contemporary frameworks typically encompass multiple domains including subject content knowledge, pedagogical content knowledge, general pedagogical knowledge, assessment competencies, and professional competencies (Blömeke, Gustafsson, & Shavelson, 2015). Research demonstrates that teacher competencies significantly influence instructional quality and learner outcomes, with effects particularly pronounced in subjects requiring specialized pedagogical approaches (Kunter et al., 2013).

Pedagogical content knowledge (PCK)—teachers' understanding of how to make specific content comprehensible to learners—has emerged as a particularly critical competency domain (Shulman, 1987). Studies across subjects and contexts consistently find that PCK predicts teaching effectiveness more strongly than content knowledge alone (Baumert et al., 2010). For creative arts education, PCK encompasses understanding learners' creative development stages, common misconceptions about artistic processes, and effective strategies for scaffolding creative expression (Kokotsaki, 2011).

Technology integration represents an increasingly essential teacher competency, particularly in creative arts where digital tools enable new forms of creation, collaboration, and presentation (Henriksen et al., 2016). The TPACK framework emphasizes that effective technology integration requires not merely technical skills but understanding how technological, pedagogical, and content considerations intersect (Mishra & Koehler, 2006). Research indicates that many teachers lack the technological competencies required for contemporary creative arts instruction, limiting their capacity to prepare learners for digitally-mediated creative practices (Peppler & Wohlwend, 2018).

Professional development research reveals that effective capacity-building interventions share common characteristics: they are sustained rather than episodic, focused on specific pedagogical practices, embedded in teachers' work contexts, and supported by collaborative professional learning communities (Darling-Hammond, Hyler, & Gardner, 2017). Conversely, traditional workshop-based professional development typically produces minimal changes in teaching practice or learner outcomes (Desimone & Pak, 2017). These findings suggest that addressing creative arts teachers' competency gaps requires strategically designed, sustained interventions rather than conventional training approaches.

### **2.4. Competency Mapping Methodologies**

Competency mapping—the systematic process of identifying, defining, and assessing competencies required for specific roles—provides foundation for targeted professional development (Dubois & Rothwell, 2004). Effective competency mapping typically involves multiple data sources including job analysis, expert consultation, performance assessment, and self-evaluation (Lucia & Lepsinger, 1999). In educational contexts, competency mapping serves multiple purposes including curriculum design, teacher evaluation, professional development planning, and quality assurance (Wesselink, 2010).

Various methodological approaches exist for competency assessment, each with distinct advantages and limitations. Self-assessment instruments, while efficient for large-scale studies, risk response biases including social desirability and inaccurate self-perception (Dunning, Heath, & Suls, 2004). Performance-based assessments provide more valid competency evidence but require substantial resources and expertise (Darling-Hammond, 2010). Multi-method approaches combining self-assessment, peer evaluation, and performance evidence offer optimal validity while maintaining feasibility (Koster, Brekelmans, Korthagen, & Wubbels, 2005).

Gap analysis techniques enable identification of priority development areas by comparing current and required competency levels (Dubois & Rothwell, 2004). Importance-performance analysis (IPA) extends basic gap analysis by considering both the magnitude of gaps and the importance of specific competencies, enabling strategic prioritization of interventions (Martilla & James, 1977). Applied to teacher professional development, IPA identifies "high priority"

competencies (high importance, low performance), "low priority" competencies (low importance, low performance), and "maintain" competencies (high importance, high performance) (Bacon, 2003).

## 2.5. CBC Implementation in Kenya: Context and Challenges

Kenya's CBC represents the most comprehensive curriculum reform since independence, fundamentally reconceptualizing educational purposes, content organization, and pedagogical approaches (Ministry of Education, 2017). The curriculum emphasizes seven core competencies—communication, collaboration, critical thinking, creativity, citizenship, digital literacy, and learning to learn—intended to prepare learners for knowledge economy participation (KICD, 2017). Creative arts subjects explicitly support multiple competencies, particularly creativity, communication, and cultural identity.

Implementation research reveals significant challenges across multiple dimensions. Teachers report inadequate pre-service and in-service preparation, particularly for learner-centered pedagogies and formative assessment approaches (Waweru & Nyagosia, 2019). Resource constraints limit hands-on learning opportunities, especially in creative arts subjects requiring materials, equipment, and space (Njagi, 2019). Large class sizes undermine individualized instruction and authentic assessment, core CBC principles (Kaviti, 2018). These challenges are particularly acute in under-resourced schools and marginalized regions, raising concerns about implementation equity.

Specific to creative arts education, research identifies critical gaps in teacher knowledge and confidence. Many primary school teachers lack specialized training in music, visual arts, or physical education, having been assigned these subjects despite their training in other areas (Akuno, 2016). The CBC's emphasis on integrated learning approaches, where creative arts connect with other subjects, requires pedagogical competencies many teachers have not developed (Muriithi & Mweru, 2019). Assessment expectations—requiring documentation of creative processes, portfolios, and performance assessments—diverge substantially from traditional testing approaches, necessitating new competencies (Kimotho, 2020).

Professional development provision for CBC implementation has been criticized as inadequate and ineffective. Cascade training models, where small numbers of teachers receive training then train colleagues, suffer from content dilution and limited follow-up support (Piper, Zuilkowski, & Mugenda, 2014). Training often focuses on curriculum content rather than pedagogical transformation, leaving teachers unclear about how to implement CBC principles in practice (Wanjohi, 2019). Moreover, professional development has not adequately addressed creative arts subjects' unique requirements, treating all learning areas uniformly despite their distinct pedagogical demands.

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## 3. Methodology

### 3.1. Research Design

This study employed a cross-sectional survey research design to map creative arts trainers' competencies and identify professional development priorities. The quantitative approach enabled systematic assessment of competency levels across a large, geographically dispersed sample while facilitating statistical analysis of competency gaps and priority areas (Creswell & Creswell, 2018). The cross-sectional design provided a snapshot of current competency profiles, appropriate for the study's diagnostic objectives (Rindfleisch, Malter, Ganesan, & Moorman, 2008).

### 3.2. Study Population and Sampling

The target population comprised creative arts trainers (music, art and craft, physical education) teaching in public primary and junior secondary schools across Kenya's 47 counties. According to Kenya National Bureau of Statistics education data, approximately 95,000 teachers instruct creative arts subjects at these levels, though many do so without specialized training (KNBS, 2020).

Sample size was determined using Yamane's formula for finite populations with 95% confidence level and 5% margin of error, yielding a minimum sample of 384 participants (Yamane, 1967). To ensure geographic representation, stratified random sampling was employed with counties as strata. Within each county, schools were randomly selected proportional to county size, and within selected schools, one creative arts trainer per subject area was randomly selected to participate.

The final sample comprised 384 creative arts trainers: 136 music teachers, 128 art and craft teachers, and 120 physical education teachers. Participants represented diverse contexts including urban and rural schools, well-resourced and

under-resourced institutions, and varying levels of professional experience. Table 1 presents detailed sample characteristics.

### 3.3. Research Instrument

A comprehensive competency assessment instrument was developed based on CBC creative arts curriculum requirements, teacher competency frameworks, and literature review. The instrument comprised five main sections:

- **Section A: Demographic Information** – Collected data on gender, age, teaching experience, education level, specialization, school location, and school type.
- **Section B: Pedagogical Knowledge Competencies** – Assessed competencies in learner-centered instruction, differentiated teaching, classroom management, and engagement strategies (15 items).
- **Section C: Subject Content Mastery** – Evaluated knowledge of creative arts subject content, curriculum understanding, and disciplinary practices (12 items).
- **Section D: Assessment Competencies** – Measured competencies in formative and summative assessment, feedback provision, and portfolio assessment (10 items).
- **Section E: Technology Integration and CBC-Specific Competencies** – Assessed digital literacy for arts education, inclusive pedagogy, integrated learning approaches, and community engagement (13 items).

Each competency item was assessed using two parallel 5-point Likert scales: importance (1=not important to 5=critically important) and current performance level (1=no competence to 5=expert competence). This dual-scaling approach enabled importance-performance gap analysis for prioritization (Bacon, 2003).

### 3.4. Validity and Reliability

Content validity was established through expert review by curriculum specialists from KICD, university faculty in arts education, and experienced creative arts trainers (n=8). Experts evaluated item relevance, clarity, and comprehensiveness, resulting in instrument refinement based on their feedback (Polit & Beck, 2006).

The instrument was pilot tested with 40 creative arts trainers from two counties not included in the main study. Pilot data were analyzed for internal consistency using Cronbach's alpha, yielding acceptable reliability coefficients: pedagogical knowledge ( $\alpha=0.87$ ), subject content mastery ( $\alpha=0.84$ ), assessment competencies ( $\alpha=0.89$ ), and technology/CBC competencies ( $\alpha=0.91$ ). Overall instrument reliability was  $\alpha=0.93$ , indicating excellent internal consistency (Nunnally & Bernstein, 1994).

### 3.5. Data Collection Procedures

Data collection occurred over three months following ethical approval from relevant authorities. County and sub-county education officers were contacted to facilitate school access. Trained research assistants administered the questionnaire to participants during school visits, ensuring completion in controlled conditions to minimize response bias. Participation was voluntary with informed consent obtained from all participants. Anonymity was assured to encourage honest self-assessment.

### 3.6. Data Analysis

Data were analyzed using SPSS version 26. Descriptive statistics (means, standard deviations, frequencies, percentages) characterized competency levels and sample demographics. Competency gaps were calculated as the difference between importance and performance ratings for each item (Dubois & Rothwell, 2004).

Importance-Performance Analysis (IPA) was conducted by plotting mean importance against mean performance scores for each competency domain. This generated four quadrants: (1) high priority (high importance, low performance), (2) keep up good work (high importance, high performance), (3) low priority (low importance, low performance), and (4) possible overkill (low importance, high performance) (Martilla & James, 1977).

Independent samples t-tests examined competency differences between urban and rural trainers, while one-way ANOVA tested differences across education levels, experience categories, and subjects. Statistical significance was set at  $p<0.05$ . Effect sizes (Cohen's d, eta squared) were reported to indicate practical significance (Cohen, 1988).

### 3.7. Ethical Considerations

Ethical approval was obtained from the National Commission for Science, Technology and Innovation (NACOSTI). Additional permissions were secured from county education offices and school administrators. Participants received information sheets explaining study purposes, procedures, and their rights. Written informed consent was obtained before participation. Data confidentiality was maintained through anonymous questionnaires and secure data storage. Participants were informed of their right to withdraw without consequences.

## 4. Findings and Discussion

### 4.1. Demographic Characteristics

The sample comprised 384 creative arts trainers with diverse demographic profiles reflecting Kenya's educational landscape. Gender distribution showed 58.3% male and 41.7% female participants, consistent with broader teaching workforce patterns. Age distribution revealed 32.8% aged 25-34 years, 41.4% aged 35-44 years, 19.3% aged 45-54 years, and 6.5% aged 55 years and above, indicating a relatively experienced workforce.

Teaching experience varied considerably: 28.6% had 1-5 years experience, 35.2% had 6-10 years, 24.5% had 11-15 years, and 11.7% had over 15 years experience. Education qualifications showed 18.2% held diplomas, 67.4% possessed bachelor's degrees, and 14.4% had postgraduate qualifications. Notably, only 43.5% had specialized training in their creative arts subject area, while 56.5% taught creative arts subjects without specialized preparation—a finding with significant implications for competency profiles.

Geographic distribution revealed 39.6% taught in urban schools, 35.4% in peri-urban settings, and 25.0% in rural areas. School types included 78.4% public schools, 18.2% private schools, and 3.4% informal settlements schools. This diversity enabled robust analysis of contextual variations in competency profiles.

### 4.2. Overall Competency Levels Across Domains

Analysis of overall competency levels revealed concerning patterns across all assessment domains. Table 2 presents mean importance ratings, performance ratings, and gap scores for each competency domain.

- **Pedagogical Knowledge Competencies** received the highest importance rating ( $M=4.52$ ,  $SD=0.48$ ) but demonstrated moderate performance ( $M=3.18$ ,  $SD=0.72$ ), yielding a substantial gap of 1.34 points. Trainers recognized the critical importance of learner-centered pedagogies, differentiated instruction, and engagement strategies but acknowledged limited competence in these areas.
- **Subject Content Mastery** showed relatively high performance ( $M=3.67$ ,  $SD=0.64$ ) compared to other domains, with importance rated at  $M=4.48$ ,  $SD=0.52$ , producing a gap of 0.81 points. This finding suggests that trainers feel more confident in their subject knowledge than pedagogical competencies—a pattern consistent with traditional teacher training emphases on content over pedagogy.
- **Assessment Competencies** revealed the largest gap of all domains ( $M=2.34$ ,  $SD=0.89$ ) between importance ( $M=4.61$ ,  $SD=0.43$ ) and performance ( $M=2.27$ ,  $SD=0.74$ ). This critical deficit reflects trainers' struggles with CBC's formative assessment expectations, portfolio development, and providing constructive feedback—competencies essential for competency-based education.
- **Technology Integration and CBC-Specific Competencies** demonstrated the second-largest gap ( $M=2.18$ ,  $SD=0.95$ ), with importance rated at  $M=4.38$ ,  $SD=0.58$  and performance at  $M=2.20$ ,  $SD=0.81$ . Trainers acknowledged technology's importance for contemporary creative arts education but reported minimal competence in digital tools, online resources, and technology-enhanced instruction.

Only 23% of participants demonstrated proficient competency levels (performance ratings  $\geq 4.0$ ) across all four domains, indicating that the vast majority of creative arts trainers lack the comprehensive competencies required for effective CBC implementation. This finding validates concerns about teacher preparedness and underscores the urgency of systematic professional development interventions.

### 4.3. Specific Competency Gaps: Item-Level Analysis

Item-level analysis identified specific competencies with the most critical gaps, informing targeted intervention priorities:

The assessment and evaluation competencies reveal substantial capacity gaps among teachers, particularly in areas that are central to competency-based learning in creative arts. The largest gap is observed in the implementation of formative assessment strategies (Gap = 2.58,  $p < 0.001$ ), indicating significant difficulty in using ongoing assessment to inform instruction and support learner growth. Similarly, teachers demonstrate limited competence in developing and using rubrics for creative arts assessment (Gap = 2.52,  $p < 0.001$ ), a critical tool for evaluating performance-based and process-oriented learning. Challenges are also evident in providing constructive feedback on creative processes (Gap = 2.41,  $p < 0.001$ ), managing learner portfolios (Gap = 2.39,  $p < 0.001$ ), and assessing creativity and creative thinking (Gap = 2.35,  $p < 0.001$ ). Collectively, these findings suggest that teachers struggle to assess not only final products but also the creative processes and competencies emphasized under the CBC framework.

In terms of technology integration competencies, the findings indicate notable gaps in teachers' ability to effectively use digital tools to support creative arts instruction. The use of digital tools in teaching creative arts registers a high competency gap (Gap = 2.47,  $p < 0.001$ ), reflecting limited confidence and skills in leveraging technology for instructional purposes. Teachers also face challenges in integrating online resources into their lessons (Gap = 2.38,  $p < 0.001$ ) and in teaching digital creativity and production skills (Gap = 2.29,  $p < 0.001$ ), which are increasingly important in contemporary creative arts education. Additionally, the use of technology for learner assessment presents a considerable gap (Gap = 2.21,  $p < 0.001$ ), suggesting that digital assessment practices are not yet well embedded in classroom practice.

Pedagogical competencies show moderate but still statistically significant gaps, particularly in learner-centered and inclusive instructional approaches. Teachers experience difficulties in implementing differentiated instruction (Gap = 2.05,  $p < 0.001$ ), which is essential for addressing diverse learner abilities and interests. Gaps are also evident in facilitating collaborative learning (Gap = 1.98,  $p < 0.001$ ) and integrating creative arts with other subjects (Gap = 1.94,  $p < 0.001$ ), both of which are key expectations of the CBC's interdisciplinary approach. Furthermore, engaging all learners in practical activities (Gap = 1.87,  $p < 0.001$ ) and managing large classes for hands-on learning (Gap = 1.85,  $p < 0.001$ ) remain persistent challenges, pointing to contextual and structural constraints within schools.

Finally, CBC-specific competencies highlight significant gaps related to the effective implementation of the competency-based curriculum in creative arts. Teachers demonstrate limited capacity in developing core competencies through creative arts (Gap = 2.12,  $p < 0.001$ ), underscoring difficulties in aligning creative activities with broader competency outcomes. Implementing inclusive education practices also shows a high gap (Gap = 2.08,  $p < 0.001$ ), indicating challenges in accommodating learners with diverse needs. In addition, engaging parents and the community in creative arts learning (Gap = 1.92,  $p < 0.001$ ) and documenting learner progress and competency development (Gap = 1.88,  $p < 0.001$ ) remain areas of concern. These gaps suggest that while the CBC provides a strong conceptual framework, teachers require further support and professional development to translate its principles into effective classroom practice.

These specific gaps illuminate concrete professional development needs. The predominance of assessment-related competencies among the highest gaps suggests that traditional teacher training has inadequately prepared trainers for CBC's assessment paradigm shift. Similarly, substantial technology integration gaps reflect insufficient investment in digital literacy development for creative arts educators.

#### 4.4. Importance-Performance Matrix Analysis

Importance-Performance Analysis generated strategic priorities by plotting competency domains within a four-quadrant matrix. Figure 1 visualizes this analysis:

- **Quadrant I: High Priority (High Importance, Low Performance)** This quadrant contained assessment competencies (Importance=4.61, Performance=2.27) and technology integration competencies (Importance=4.38, Performance=2.20). These domains represent critical professional development priorities requiring immediate, intensive intervention. Their high importance combined with low performance indicates they significantly constrain effective CBC implementation.
- **Quadrant II: Keep Up Good Work (High Importance, High Performance)** Subject content mastery occupied this quadrant (Importance=4.48, Performance=3.67), suggesting trainers possess adequate subject knowledge that should be maintained through continuous professional development. However, even this "strength" area showed room for improvement, with performance below proficiency levels.
- **Quadrant III: Low Priority (Low Importance, Low Performance)** No competency domains fell clearly into this quadrant, indicating that all assessed areas held significant importance for CBC implementation. This finding validates the instrument's focus on essential competencies.

- **Quadrant IV: Possible Overkill (Low Importance, High Performance)** Similarly, no domains occupied this quadrant, suggesting balanced competency development without over-emphasis on less critical areas.
- **Pedagogical knowledge competencies** positioned near the boundary between Quadrants I and II (Importance=4.52, Performance=3.18), indicating moderate priority requiring sustained attention. While performance exceeded assessment and technology domains, it remained below levels required for exemplary CBC implementation.

#### 4.5. Competency Variations by Demographics and Context

Statistical analyses revealed significant competency variations across multiple demographic and contextual variables, with important implications for differentiated professional development.

- **Urban-Rural Differences:** Independent samples t-tests demonstrated that urban trainers significantly outperformed rural counterparts across all competency domains. The largest differences appeared in technology integration ( $M_{urban}=2.64$ ,  $M_{rural}=1.52$ ,  $t(382)=9.87$ ,  $p<0.001$ ,  $d=1.42$ ) and assessment competencies ( $M_{urban}=2.68$ ,  $M_{rural}=1.71$ ,  $t(382)=8.34$ ,  $p<0.001$ ,  $d=1.18$ ). Urban-rural gaps averaged 34% across domains, reflecting disparities in resources, infrastructure, training access, and professional support networks. These findings underscore the need for context-sensitive professional development that addresses rural trainers' specific constraints.
- **Education Level:** One-way ANOVA revealed significant main effects of education level on overall competency scores ( $F(2,381)=24.67$ ,  $p<0.001$ ,  $\eta^2=0.115$ ). Post-hoc Tukey tests showed postgraduate-qualified trainers ( $M=3.41$ ,  $SD=0.58$ ) significantly outperformed bachelor's degree holders ( $M=2.95$ ,  $SD=0.64$ ,  $p<0.001$ ) and diploma holders ( $M=2.47$ ,  $SD=0.71$ ,  $p<0.001$ ). This pattern held across all competency domains, suggesting that advanced education contributes to professional competence—though notably, even postgraduate-qualified trainers demonstrated substantial competency gaps.
- **Specialized Training:** Trainers with specialized creative arts training demonstrated significantly higher competencies than those without specialization across all domains ( $t(382)=7.92$ ,  $p<0.001$ ,  $d=0.89$ ). Specialized trainers showed particular advantages in pedagogical knowledge ( $M_{specialized}=3.64$  vs.  $M_{non-specialized}=2.81$ ,  $p<0.001$ ) and subject content mastery ( $M_{specialized}=4.12$  vs.  $M_{non-specialized}=3.31$ ,  $p<0.001$ ). This finding validates the importance of subject-specific teacher preparation and suggests that professional development should prioritize trainers lacking specialized backgrounds.
- **Teaching Experience:** Contrary to expectations, teaching experience showed no significant correlation with competency levels ( $r=-0.08$ ,  $p=0.134$ ). Trainers with 1-5 years experience performed comparably to those with 15+ years experience across domains. This surprising finding suggests that experience alone does not develop CBC-required competencies, likely because veteran teachers were trained in traditional pedagogies and have received limited opportunities for professional renewal. The implication is that professional development must target all experience levels rather than focusing primarily on novice teachers.
- **Subject Area:** One-way ANOVA revealed modest but significant differences across creative arts subjects ( $F(2,381)=5.23$ ,  $p=0.006$ ,  $\eta^2=0.027$ ). Physical education trainers reported higher pedagogical competencies ( $M=3.38$ ) than art and craft ( $M=3.15$ ) or music trainers ( $M=3.02$ ), possibly reflecting physical education's longer history of emphasis on practical, activity-based learning. However, physical education trainers showed lower subject content mastery, likely due to broader professional preparation focusing on general movement rather than specialized disciplinary knowledge. These differences suggest potential for cross-subject professional learning communities where trainers share pedagogical strengths.

#### 4.6. Discussion of Findings

##### 4.6.1. Competency Gaps and CBC Implementation Challenges

The study's findings illuminate critical challenges undermining CBC implementation in creative arts education. The substantial competency gaps across all domains, with only 23% of trainers demonstrating proficient competencies, suggest that current implementation efforts proceed on fragile foundations. This reality likely explains persistent reports of CBC implementation difficulties and raises questions about whether the curriculum's ambitious objectives can be realized without massive investment in teacher capacity development.

Assessment competencies' emergence as the largest gap area aligns with international research documenting teachers' struggles with competency-based assessment paradigms (Harris et al., 2018). Traditional teacher training emphasized summative testing aligned with examination-oriented curricula, leaving educators ill-equipped for CBC's formative, developmental assessment approaches. Creative arts assessment poses particular challenges given the subjective

nature of creative work, the importance of process over product, and the necessity of individualized feedback—all requiring sophisticated professional judgment that current training has not developed (Eisner, 2002).

Technology integration's position as the second-largest gap area reflects broader digital divide challenges affecting Kenya's education sector. While CBC emphasizes digital literacy as a core competency, many schools—particularly in rural areas—lack basic technological infrastructure (Wanjohi, 2019). Even where technology exists, trainers lack competencies to integrate it meaningfully into creative arts instruction. This gap is particularly concerning given technology's transformative potential for creative arts education, enabling digital creation, virtual collaboration, and access to global artistic resources (Henriksen et al., 2016).

The study's finding that subject content mastery represents trainers' strongest competency area, yet still shows gaps, challenges assumptions about teacher knowledge. While trainers feel relatively confident in subject content, their performance levels ( $M=3.67$ ) suggest room for deepening disciplinary understanding. Moreover, content knowledge alone proves insufficient for effective CBC implementation, which demands sophisticated pedagogical content knowledge—understanding how to make content accessible, engaging, and developmentally appropriate (Shulman, 1987).

#### *4.6.2. Contextual Variations and Equity Implications*

The substantial urban-rural competency gaps (averaging 34%) expose serious equity concerns in CBC implementation. Rural trainers' significantly lower competencies across all domains suggest that rural learners receive systematically lower-quality creative arts instruction, perpetuating educational inequalities that CBC purports to address. These gaps likely stem from multiple interacting factors: limited access to professional development, inadequate infrastructure, larger class sizes, fewer resources, and professional isolation from peer learning networks (Hardman et al., 2009).

The technology integration gap's particularly pronounced urban-rural disparity ( $d=1.42$ ) reflects both infrastructure constraints and training access inequalities. Rural schools' limited connectivity, equipment shortages, and inadequate technical support create environments where trainers cannot develop or apply technology integration competencies even if trained. Addressing this gap requires systemic interventions beyond professional development, including infrastructure investment and context-appropriate technology solutions.

The finding that specialized training significantly predicts competency levels validates investments in subject-specific teacher preparation. However, with 56.5% of creative arts trainers lacking specialized backgrounds, the reality is that most creative arts instruction occurs by teachers without adequate preparation. This pattern likely results from teacher deployment policies prioritizing core academic subjects over creative arts, leaving schools to assign these subjects to available teachers regardless of qualifications. Rectifying this situation requires both policy changes ensuring appropriate teacher deployment and intensive professional development for the large population of non-specialized trainers currently teaching creative arts.

#### *4.6.3. Experience and Professional Development Implications*

The absence of correlation between teaching experience and competency levels carries profound implications for professional development design. This finding suggests that informal, experience-based learning proves insufficient for developing CBC-required competencies—particularly pedagogical approaches that diverge fundamentally from traditional practices. Veteran teachers, trained in examination-oriented pedagogies and having practiced these approaches for decades, require substantial professional development to transform their practice. Simply assuming experienced teachers will adapt naturally to CBC overlooks the difficulty of changing deeply ingrained instructional habits (Vavrus et al., 2011).

This finding also challenges cascade training models that typically rely on experienced teachers as trainers-of-trainers. If experience does not correlate with competence, selecting experienced teachers for cascade training may not ensure quality training provision. Alternative approaches emphasizing demonstrated competence rather than experience should guide professional development infrastructure development.

#### *4.6.4. Assessment Competencies: A Critical Bottleneck*

Assessment competencies' emergence as the most critical gap area deserves particular attention given assessment's centrality to competency-based education. CBC's emphasis on formative assessment, continuous feedback, and competency documentation requires fundamental shifts in assessment practice that current trainers have not mastered (Kimotho, 2020). Creative arts assessment poses unique challenges: evaluating creativity, providing feedback on

subjective artistic expressions, documenting developmental progressions, and balancing process and product considerations.

The specific competency gaps identified—rubric development (Gap=2.52), formative assessment implementation (Gap=2.58), portfolio management (Gap=2.39)—represent concrete professional development targets. However, addressing these gaps requires more than technical training in assessment tools. Trainers need conceptual understanding of competency-based assessment principles, opportunities to practice assessment in supported environments, and ongoing feedback on their assessment practices (Darling-Hammond et al., 2017).

Moreover, assessment competency development faces systemic obstacles including large class sizes making individualized assessment impractical, limited time for portfolio review and feedback provision, and lack of assessment resources and tools. Professional development must acknowledge these constraints while equipping trainers with strategies for managing assessment demands within existing conditions.

#### *4.6.5. Technology Integration: Beyond Infrastructure*

While technology infrastructure limitations constrain integration efforts, this study reveals that competency gaps extend beyond access issues. Even urban trainers with technology access demonstrated substantial integration competencies gaps, suggesting that availability alone does not ensure effective use. Trainers need not merely technical skills but pedagogical understanding of how technology can enhance creative arts learning—what the TPACK framework terms technological pedagogical content knowledge (Mishra & Koehler, 2006).

For creative arts education, technology integration encompasses diverse applications: digital creation tools (graphic design, music production, video editing), online resources and virtual museums, collaborative platforms, documentation and portfolio systems, and assistive technologies for inclusive education. Each application requires specific competencies combining technical proficiency, pedagogical knowledge, and creative arts understanding. Professional development must move beyond basic digital literacy to subject-specific technology integration.

The study's findings also highlight the need for context-appropriate technology solutions. Given infrastructure constraints, particularly in rural areas, professional development should emphasize low-tech and no-tech alternatives alongside digital tools. Trainers need competencies in selecting appropriate technologies for their contexts, adapting digital resources for offline use, and maximizing limited technology access.

#### *4.6.6. Implications for Teacher Education and Professional Development*

These findings have significant implications for both pre-service teacher education and in-service professional development. Pre-service programs must ensure all teacher candidates develop CBC-required competencies before entering classrooms, with specialized preparation for creative arts teachers. Current evidence suggests teacher training colleges and universities have not adequately reformed their programs to align with CBC, perpetuating the cycle of inadequately prepared teachers (Ondimu, 2018).

For in-service professional development, the competency gaps identified provide clear targets for intervention design. However, addressing these gaps requires moving beyond traditional workshop-based training to sustained, practice-embedded professional development. Research consistently demonstrates that effective professional development is prolonged, focused on specific instructional practices, embedded in teachers' work contexts, and supported by collaborative learning communities (Desimone & Pak, 2017).

The study's identification of specific high-priority competencies (formative assessment, technology integration, differentiated instruction) enables strategic resource allocation. Rather than attempting to address all competency gaps simultaneously—likely overwhelming trainers and diluting impact—professional development can prioritize critical areas while building incrementally toward comprehensive competency development.

Differentiated professional development approaches are necessary given the substantial variations in competency profiles across contexts and demographics. Rural trainers require different support than urban counterparts, non-specialized trainers need distinct interventions than specialized teachers, and subject-specific needs must be addressed. One-size-fits-all professional development approaches will likely perpetuate existing inequities rather than addressing them.

#### 4.6.7. Policy Implications

From a policy perspective, these findings underscore the inadequacy of curriculum reform without corresponding systemic investment in implementation capacity. CBC's ambitious objectives cannot be realized through policy documents and minimal training; they require sustained, substantial investment in teacher professional development, infrastructure, and support systems. Current professional development provision falls far short of what evidence suggests is necessary for transforming teaching practice at scale.

Teacher deployment policies need revision to ensure creative arts subjects are taught by qualified personnel. The current practice of assigning these subjects to any available teacher regardless of preparation undermines both creative arts education quality and broader CBC objectives. Specialized teacher training programs in creative arts should be expanded, and incentives created to attract specialized teachers to under-resourced and rural schools.

Quality assurance mechanisms aligned with CBC competency requirements need development. Current teacher evaluation systems emphasize compliance and administrative tasks rather than instructional quality and competency development (TSC, 2019). Evaluation frameworks should incorporate the competencies identified in this study, providing both accountability and professional learning opportunities.

Finally, the study's findings highlight the need for implementation research that examines not merely policy intentions but actual classroom practices and their determinants. Kenya's education sector would benefit from establishing systematic mechanisms for monitoring implementation quality, identifying challenges, and adapting approaches based on evidence—an adaptive implementation approach rather than rigid adherence to initial plans.

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## 5. Conclusion

This study provides empirical evidence of substantial competency gaps among creative arts trainers implementing Kenya's CBC, with only 23% demonstrating proficient competencies across required domains. Critical gaps in assessment competencies (mean gap: 2.34), technology integration (2.18), and pedagogical knowledge (1.34) significantly constrain effective CBC implementation. The identification of specific high-priority competencies—particularly formative assessment strategies, digital literacy for arts education, and differentiated instruction—provides clear targets for professional development interventions.

Significant contextual variations, with urban trainers outperforming rural counterparts by 34%, expose serious equity implications requiring differentiated support approaches. The finding that teaching experience does not correlate with competency levels challenges assumptions about informal professional learning and highlights the necessity of structured, sustained professional development. These findings collectively indicate that realizing CBC's transformative potential requires massive, strategic investment in teacher capacity development, moving beyond current inadequate professional development provision to evidence-based, sustained interventions that acknowledge teachers' diverse needs and contexts while addressing systemic implementation barriers.

### *Recommendations*

Based on these findings, the following recommendations are proposed:

- **For Policy Makers and Education Authorities:**

Develop and fund a comprehensive, multi-year professional development program specifically targeting identified competency gaps, with priority given to assessment and technology integration competencies

Establish differentiated support systems recognizing urban-rural disparities, including infrastructure investment, mobile training teams, and technology appropriate for resource-constrained contexts

Revise teacher deployment policies to ensure creative arts subjects are taught by appropriately qualified personnel, and expand specialized pre-service training programs

- **For Professional Development Providers:**

Design sustained, practice-embedded professional development replacing episodic workshops, incorporating lesson study, coaching, and professional learning communities

Prioritize high-gap competencies identified through importance-performance analysis while acknowledging that comprehensive competency development requires multi-year commitment

Create subject-specific professional development addressing creative arts' unique pedagogical demands rather than treating all learning areas uniformly

- **For Teacher Education Institutions:**

Reform pre-service programs to ensure CBC competency development, particularly in assessment, technology integration, and learner-centered pedagogies, before teacher candidates enter classrooms

- **For Future Research:**

Conduct longitudinal studies examining competency development trajectories and professional development intervention effectiveness, and investigate relationships between trainer competencies, instructional quality, and learner outcomes to strengthen the evidence base for teacher professional development investment.

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