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Challenges and Opportunities in the Implementation of Integrated Competency-Based Education in Selected Kenya Medical Training College Campuses in Western Kenya

Masinde Mukhwana Anthony, Kangethe Simon and Sum Psusma Tecla

Department of Medical Education, School of Medicine, Moi University, College of Health Sciences, P.O. Box 4606-30100, Eldoret, Kenya

Abstract

Competency-based education is a design of teaching and learning that emphasizes the demonstration and application of specific competencies or skills by learners. The practice of medicine becomes increasingly complex each passing year. Despite the affordance of CBE in preparing learners for the challenges of the 21st century, its implementation in Africa continues to be more challenging. This study examined the challenges and opportunities influencing the implementation of Integrated Competency-Based Medical Education (ICBME) in selected Kenya Medical Training College campuses in Western Kenya. The study was guided by Lev Vygotsky's social constructivism theory, which explains learning as a socially mediated process shaped through interaction, collaboration, and guided practice. A cross-sectional descriptive survey design was adopted, focusing on quantitative data collected from tutors and diploma students in clinical medicine. The study was conducted in three randomly selected campuses (Busia, Kakamega, and Webuye) drawn from nine campuses in the region. A census approach yielded a target population of 396 respondents. Data were collected using structured questionnaires and analyzed using descriptive statistics (frequencies and percentages) and inferential statistics (Chi-square tests). Findings showed that inadequate resources was the dominant challenge, reported by 75.0% of tutors and 73.6% of students, followed by faculty shortages and large class sizes. Other constraints included resistance to change, limited clinical opportunities, assessment challenges, and financial limitations. Chi-square results indicated no significant differences between tutors and students across all challenge variables ($p > 0.05$), showing consistent perceptions across groups. Key opportunities included government support and healthcare partnerships (about 20% each), followed by technological advancements and faculty development programs. High agreement on the presence of opportunities (over 95% for both groups) reflected strong

stakeholder awareness of enabling factors. The study concludes that ICBME implementation faces major structural and resource-related barriers, despite the presence of strong policy and institutional support mechanisms. It recommends targeted investment in infrastructure, expansion of clinical training opportunities and structured faculty development to strengthen implementation outcomes and produce competent healthcare graduates capable of meeting Kenya's Universal Health Coverage goals.

Keywords: Competency-Based Education, Integrated Curriculum, Kenya Medical Training College, Challenges, Western Kenya

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Correspondence: masindeanthony7@gmail.com

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Introduction

Integrated Competency-Based Medical Education (ICBME) represents a transformative instructional model that merges Community-Based Education and Service (COBES) with competency-based frameworks. Unlike traditional models that prioritize time-based instruction and broad content coverage, ICBME emphasizes the demonstration and application of specific skills aligned with societal needs, industry standards, and community health requirements (Mauki et al., 2020). This shift is driven by increasing global concerns regarding the evolving role of healthcare providers, further accelerated by the emergence of pandemics such as COVID-19, which highlighted the need for adaptive, learner-centered education (Kerdijk et al., 2013). Consequently, international bodies, including National Accreditation Councils in North America and medical schools within the European Union, have mandated well-defined competency sets to ensure graduates are better prepared for real-world practice (Frank & Danoff, 2007).

In the Africa, several institutions have initiated curriculum revamps to meet both national health requirements and international standards. For instance, the University of Ibadan in Nigeria and the collaboration between Johns Hopkins and Makerere University in Uganda have undergone significant reviews to produce graduates who effectively address local population needs (Kiguli-Malwadde et al., 2014). However, the implementation of CBE across the continent remains complex. Many tertiary systems remain

focused on standardized testing and broad content coverage at the expense of in-depth skill development, often hindered by prevailing teacher values and beliefs regarding the competency-based model.

In Kenya, the healthcare workforce crisis is characterized by inequitable distribution of professionals, inadequate training opportunities, and high rates of brain drain, necessitating urgent reforms in health professions education (Kimani & Gatimu, 2023; Okoroafor et al., 2022). The Kenya Medical Training College (KMTC), as the largest health training institution in East Africa with over 120 academic programs and numerous campuses across the country, plays a pivotal role in shaping the nation's health workforce (Kimani & Gatimu, 2023). The shift toward CBE was formally launched by the Ministry of Education in 2017 following the realignment of the education sector with the Constitution of Kenya 2010 (KICD, 2016). While basic education has transitioned, a significant gap remains in the continuum to tertiary and medical vocational training. Currently, several Kenyan medical schools, including KMTC, still rely heavily on subject-centered models that prioritize a broad base of knowledge over dynamic, contextual competence. Although KMTC has attempted to adopt elements of CBE, the integration of community-based practice remains poorly documented and inconsistently applied.

The transition from traditional educational models to ICBME is fraught with challenges documented across various African contexts. A comprehensive scoping review of CBE implementation for midwifery programs across 17 African countries revealed that despite widespread policy adoption, actual implementation remains inconsistent and unsustainable (Ige et al., 2024). Major barriers include poor knowledge of CBE pedagogical approaches among educators, inadequate human and material resources, insufficient time allocation for competency-based activities, lack of continuous support and motivation for faculty, and poor accountability mechanisms (Ige et al., 2024). In Tanzania, nurse educators demonstrated inability to deliver the intended curriculum dosage due to poor understanding and interpretation of competency-based curricula, workload pressures, and educator shortages (Ige et al., 2024). Similarly, in Uganda, while pedagogical approaches were found suitable for training competent nurses, institutionalization was hampered by inadequate material resources and insufficient student support due to staff shortages (Ige et al., 2024).

Recent policy developments have emphasized the need for competency-based approaches across all education sectors, including tertiary health training institutions (Ministry of Education, 2023). The Nursing Council of Kenya, in collaboration with international partners such as the Liverpool School of Tropical Medicine, has initiated efforts to strengthen competency-based Emergency Obstetrics and Newborn Care (EmONC) training and update nursing curricula (Ige et al., 2024). These developments suggest a favorable policy environment for ICBME implementation. However, systemic challenges persist, including poor coordination between national and county governments, inadequate planning and financing for health workforce development, and training programs that often fail to align with population health needs (Asamani et al., 2024; Kimani & Gatimu, 2023). Kenya continues to face acute shortages of nurses and midwives, with current estimates showing approximately 100 nurses per 100,000 population compared to the WHO recommended minimum of

356 per 100,000 (Nursing Council of Kenya, 2025).

Western Kenya, comprising counties such as Kisumu, Kakamega, Bungoma, and Busia, presents a distinctive context for examining ICBME implementation. This region faces significant health challenges, including high burdens of infectious diseases, maternal and child health disparities, and emerging non-communicable diseases, which demand a well-prepared, competent health workforce (Vedanthan et al., 2019). The selected KMTC campuses in this region serve diverse populations and operate within varying resource constraints, making them ideal sites for understanding contextual factors that influence ICBME implementation. Furthermore, the devolved governance structure in Kenya, where county governments are responsible for health workforce recruitment and deployment while the national government manages training institutions, creates a complex implementation environment that requires careful examination (Nyawira et al., 2022). Many of these campuses are situated in rural, resource-constrained environments, facing unique challenges related to infrastructure, personnel, and facilities, yet they also possess untapped opportunities to produce healthcare professionals capable of innovating in low-resource settings.

Despite the growing body of literature on CBE in Africa, significant gaps remain in understanding the specific challenges and opportunities associated with ICBME implementation in Kenyan health training institutions. Most existing studies have focused on basic education or specific professional programs such as midwifery, with limited attention to the integrated nature of competency-based education across multiple health disciplines (Ige et al., 2024; Kimani & Gatimu, 2023). Moreover, while challenges such as inadequate infrastructure, teacher training deficits, and resource constraints are well-documented in general education contexts, their specific manifestations in health professions education and potential solutions remain underexplored (McKenzie-White et al., 2022; Mubuuke et al., 2014). As the complexity of medicine increases due to technological advances and shifting disease patterns (Musick, 2005), there is need to evaluate the transition from time-based to competency-based models.

This study addresses these gaps by examining both the barriers to ICBME implementation and the opportunities that can be leveraged to promote successful adoption in selected KMTC campuses in Western Kenya. As Kenya strives to achieve Universal Health Coverage and address persistent health disparities, ensuring that health training institutions produce competent, confident graduates capable of meeting community health needs is paramount (Asamani et al., 2024). This study contributes to this national imperative by providing evidence-based insights into the implementation of integrated competency-based education in one of the country's most critical health training institutions.

Theoretical Framework

The study was guided by Social Constructivism Theory developed by Russian psychologist Lev Vygotsky (1896–1934) early 20th century, representing a fundamental departure from the behaviorist approaches that dominated psychology at the time (Vygotsky, 1978). The theory posits that knowledge is actively constructed through social interaction and cultural tools, particularly language, with learning occurring first at the social level through interaction with more knowledgeable others, and

subsequently at the individual level through internalization (Vygotsky, 1978). Central to this theory is the concept of the Zone of Proximal Development (ZPD), which describes the distance between what a learner can accomplish independently and what they can achieve with guidance from more capable peers or instructors (Vygotsky, 1978).

The application of social constructivism in educational research offers significant benefits while presenting certain limitations. The theory emphasizes active learning and learner autonomy, shifting from teacher-centered instruction to student-centered knowledge construction (Powell & Kalina, 2009). It promotes collaborative learning environments where students engage in dialogue and shared problem-solving, developing critical thinking and communication skills essential for professional practice (Schreiber & Valle, 2013). However, the theory faces critics including significant cognitive burden on educators requiring substantial time for task design and individualized scaffolding (Kirschner et al., 2006). Additionally, assessing learning outcomes in constructivist environments can be challenging due to the subjective nature of knowledge construction (Mogashoa, 2014). Drawing on Vygotsky's (1978) concept of the Zone of Proximal Development, the study recognizes that implementation barriers such as inadequate faculty knowledge of CBE pedagogies, resource constraints, and poor accountability mechanisms exist not merely as objective technical deficiencies but as challenges that are defined, interpreted, and potentially overcome through collaborative meaning-making among stakeholders.

Methodology

The study employed a cross-sectional descriptive survey design, focusing on quantitative data collection to assess the challenges and opportunities in the implementation of integrated competency-based education (CBE). The design facilitated collection of standardized data from respondents at a single point in time, allowing comparison of perceptions across participant groups within selected Kenya Medical Training College campuses.

The study was conducted between June 2024 and February 2025 in selected Kenya Medical Training College campuses located in Western Kenya, specifically in Busia County, Kakamega County, and Bungoma County. Three campuses; Busia, Kakamega, and Webuye were selected through random sampling from the nine campuses in the region. These campuses reflect variation in institutional capacity, with Kakamega representing a well-established campus and Busia and Webuye representing developing institutions. This variation provided a suitable basis for examining differences in CBE implementation.

The target population comprised medical tutors and diploma students in clinical medicine within the selected campuses. Tutors included both full-time and part-time instructors involved in teaching and curriculum delivery, while students were those undergoing competency-based training in clinical programs. The total target population was 396 respondents, consisting of 109 tutors and 287 students across the three campuses.

Three campuses (30% of the nine campuses in Western Kenya) were selected using simple random sampling to enhance representativeness. Within the selected campuses, a census approach was adopted due to the manageable population size. The study adopted a census sampling approach, where all members of the accessible population in the selected campuses were included in

the study (n = 396). This approach eliminated sampling error and allowed comprehensive coverage of respondents directly involved in competency-based education.

Inclusion criteria covered full-time and part-time tutors, heads of academic departments, and diploma students in clinical medicine programs within the selected campuses. Exclusion criteria included tutors on leave during the data collection period, non-consenting participants, and students enrolled in non-clinical programs. This ensured that only respondents actively engaged in competency-based education participated in the study.

Data were collected using a structured questionnaire administered to both tutors and students. The questionnaire consisted of closed-ended items measured on Likert scales, capturing key aspects of implementation challenges (such as limited resources, inadequate training, and assessment constraints) and opportunities (including institutional support, curriculum alignment, and policy frameworks). The questionnaires were administered electronically to improve efficiency and data accuracy.

A pilot study was conducted in a non-participating Kenya Medical Training College campus to test clarity, relevance, and consistency of the instrument. Feedback from the pilot informed refinement of questionnaire items. Reliability was assessed using Cronbach's alpha coefficient, with values above 0.70 considered acceptable. Content validity was established through expert review to confirm alignment with study objectives.

Collected data was analysed using descriptive statistics (frequencies, percentages, means, and standard deviations) while Chi-square tests were used to examine differences in perceptions of challenges and opportunities across respondent groups and campuses. Results were presented in tables and interpreted in line with the study objectives.

Ethical approval was obtained from the Moi University Institutional Research and Ethics Committee. Permission to conduct the study was also granted by the management of Kenya Medical Training College. Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality and anonymity were maintained, and data were handled in accordance with national data protection guidelines.

Results and Discussion

Response Rate

Response rate refers to the proportion of distributed data collection instruments that are successfully completed and returned for analysis. It indicates the level of participation in a study and directly affects the reliability and generalizability of findings. Higher response rates reduce the risk of non-response bias and improve confidence in the results.

Table 1: Response rate

Respondents	Target Population	Actual Response	Response Rate (%)
Tutors	109	82	75%
Students	287	258	90%
Total	**396**	**340**	**85.9%**

As shown in Table 1, out of a target population of 396 respondents, 340 participated in the study, yielding an overall response rate of 85.9%. Tutors

recorded a response rate of 75% while students achieved a higher response rate of 90%. The higher participation among students suggests stronger engagement compared to tutors, possibly linked to differences in availability or workload. Overall, the response rate is considered high and supports the reliability of the findings, as rates above 70% are regarded as very good for analysis and those above 80% significantly reduce the risk of non-response bias.

Background Characteristics of Respondents

Table 2 presents the demographic characteristics for the tutors and students. Examining these attributes helps interpret differences in perceptions and engagement with competency-based strategies across respondent groups.

Table 2: Demographic Characteristics of the respondents

Respondent Group	Variable	Category	Frequency	Percentage (%)
Tutors	Gender	Male	44	54.2
		Female	34	41.7
		Other	3	4.2
	Age	20–30 years	17	20.8
		31–40 years	51	62.5
		Above 40 years	14	16.7
	Education Level	Diploma	7	8.3
		Higher National Diploma	10	12.5
		Bachelor's Degree	58	70.8
		Master's Degree	7	8.3
	Employment Status	Contract	54	66.7
		Permanent	27	33.3
	Teaching Experience	< 2 years	10	12.5
		2–5 years	30	37.5
		6–10 years	21	25.0
		> 10 years	21	25.0
Students	Gender	Female	137	53.0
		Male	121	47.0
	Age	20–30 years	206	80.0
		31–40 years	52	20.0
	Program	Diploma (Clinical Medicine)	258	100.0

The findings revealed that among tutors, a slight male majority (54.2%) was observed, contrasting with the student population where females comprised 53.0%. This gender distribution among students aligns with broader trends in

Kenyan health professions education, where nursing and clinical medicine programs have historically attracted more female students, with national data indicating that females comprised 73.1% of nursing students between 1999 and 2010 (Troy et al., 2018). However, the more balanced gender ratio in this study (53% female) may reflect the specific context of clinical medicine programs, which have traditionally attracted more male students compared to nursing (Troy et al., 2018). The predominance of young adults among students (80% aged 20–30 years) mirrors findings from similar studies in Kenyan medical training institutions, where the majority of health professional students fall within this age bracket (Robert et al., 2025; Wasike et al., 2024).

The tutor demographic profile reveals a relatively young and educated workforce, with 62.5% aged 31–40 years and 70.8% holding bachelor's degrees. This concentration of tutors in the early-to-mid career stage suggests a workforce that may be more receptive to pedagogical innovations such as ICBE, as younger educators often demonstrate greater adaptability to curriculum reforms (Mogashoa, 2014). However, the limited representation of master's degree holders (8.3%) indicates potential constraints in advanced research and curriculum development capacity, which is critical for implementing evidence-based competency-based education (Ige et al., 2024). The high proportion of tutors on contract employment (66.7%) raises concerns about job security and institutional commitment, factors that may influence motivation and engagement with curriculum reform initiatives (Nyawira et al., 2022). This employment pattern reflects broader trends in Kenyan public health training institutions, where fiscal constraints and devolved governance structures have contributed to increased reliance on non-permanent staff (Asamani et al., 2024).

Teaching experience distribution among tutors shows a relatively even spread across mid-career and experienced categories, with 62.5% having 2–10 years of experience. This experience profile suggests that most tutors have sufficient practical teaching background to engage with ICBE implementation, while not being so entrenched in traditional methods as to resist pedagogical change (Mubuuke et al., 2014). However, the 12.5% with less than two years' experience may require substantial support and mentoring to effectively deliver competency-based curricula, a challenge documented in similar African contexts where novice educators struggled with CBE implementation due to inadequate orientation and supervision (Ige et al., 2024). The concentration of students in the diploma in clinical medicine program (100%) reflects KMTC's core mandate as the primary trainer of mid-level health professionals in Kenya, a role that has become increasingly critical given the country's physician shortage and the need for competent frontline healthcare providers (Kimani & Gatimu, 2023).

These demographic characteristics have significant implications for ICBE implementation. The gender balance among students suggests equitable access to clinical medicine training, though persistent underrepresentation of females in certain specialties remains a concern in Kenyan health professions education (Dossajee et al., 2016). The young age profile of both tutors and students indicates a dynamic learning environment where technology-enhanced and interactive teaching methods may be well-received, aligning with social constructivist approaches that emphasize active learning and peer collaboration (Powell & Kalina, 2009). However, the predominance of contract

employment among tutors may undermine the stability required for sustained curriculum reform, as job insecurity can reduce willingness to invest time in professional development and pedagogical innovation (Nyawira et al., 2022). Furthermore, the limited advanced qualifications among tutors may constrain their capacity to design and assess complex competency-based learning activities, highlighting the need for targeted faculty development initiatives as part of ICBE implementation (McKenzie-White et al., 2022).

Challenges Facing ICBME Implementation

The study examined the key challenges affecting the implementation of Integrated Competency-Based Medical Education (ICBME) as reported by tutors (n = 82) and students (n = 258). Table 3 presents the distribution of responses in terms of frequencies and percentages.

Table 3: Challenges facing ICBME implementation

Challenge	Tutors (f)	Tutors (%)	Students (f)	Students (%)
Inadequate Resources	62	75.0	190	73.6
Faculty Shortage	14	16.7	41	15.9
Large Class Sizes	10	12.5	34	13.2
Resistance to Change	7	8.3	24	9.3
Limited Clinical Opportunities	7	8.3	20	7.8
Assessment Challenges	3	4.2	12	4.7
Financial Constraints	3	4.2	12	4.7

Inadequate resources and infrastructure emerged as the predominant barrier to ICBME implementation, cited by 75% of tutors and 73.6% of students. This finding aligns with broader patterns across Kenyan health training institutions, where resource constraints consistently impede educational reforms. Wambugu et al. (2023) found that 97.9% of KMTC teaching staff identified resource intensity including funding, equipment, specimens, and space—as a major barrier to innovative teaching methods, while Lolepo et al. (2024) identified similar constraints affecting access to essential academic services at KMTC Lodwar Campus. The shortage of well-equipped laboratories, simulation centers, and ICT facilities forces educators to rely on traditional lectures, which are less effective for delivering Problem-Based Learning (PBL) and Community-Based Education and Service (COBES), both requiring hands-on practice to develop clinical competencies (Kiguli-Malwadde et al., 2014). Focus group discussions underscored that these resource constraints compel tutors to prioritize theoretical instruction, limiting the practical, competency-focused training central to ICBME.

Faculty shortage emerged as the second most prevalent challenge, reported by 16.7% of tutors and 15.9% of students. This finding resonates with national data indicating acute shortages of nursing and midwifery faculty in Kenya, with current estimates showing approximately 100 nurses per 100,000 population compared to the WHO recommended minimum of 356 per 100,000 (Nursing Council of Kenya, 2025). The challenge is compounded by the high proportion of contract employment among tutors (66.7%), which undermines job security and institutional commitment essential for sustained curriculum reform (Asamani et al., 2024). Research on preceptorship in Ugandan health sciences

institutions identified high student-to-preceptor ratios as a major barrier to effective clinical teaching, with preceptors reporting that overwhelming student numbers severely limited opportunities for individualized supervision (Wani et al., 2025). This faculty shortage reflects a broader challenge in African medical education, where faculty development often lags behind curriculum reform, necessitating targeted training programs (Curry & Docherty, 2017).

Large class sizes were identified by 12.5% of tutors and 13.2% of students as a significant challenge, hindering individualized attention a critical aspect of Self-Directed Learning (SDL) that fosters independent learning and critical thinking skills essential for medical practice (Nsengimana et al., 2020). This finding is consistent with studies documenting overcrowding in Kenyan medical training institutions, where increasing student enrollments have not been matched by proportional expansion in teaching capacity or clinical placement sites (Dossajee et al., 2016). Large class sizes are particularly problematic because competency-based education requires intensive, individualized assessment and feedback mechanisms that are difficult to implement with high student-to-teacher ratios (Ige et al., 2024). A study on resource preparedness for CBE implementation in Kenyan junior secondary schools similarly identified inadequate physical infrastructure and overcrowding as major impediments to effective curriculum delivery (Mwangi & Mwangi, 2025).

Resistance to change was reported by 8.3% of tutors and 9.3% of students, reflecting the human dimension of curriculum reform. This finding aligns with research from Ethiopian health science colleges, where instructor resistance and skepticism toward competency-based curricula emerged as significant barriers, with some educators perceiving traditional curricula as more effective for student learning (Tadesse et al., 2025). The resistance phenomenon is often rooted in inadequate training and preparation for curriculum transition, as documented in a scoping review of CBE implementation across 17 African countries, which identified poor knowledge of CBE pedagogical approaches among educators as a primary obstacle (Ige et al., 2024). This resistance complicates the transition to learner-centered approaches like PBL, which require a cultural shift in teaching practices (Ruth & Ramadas, 2019).

Limited clinical training opportunities were cited by 8.3% of tutors and 7.8% of students, reflecting intense competition for placements—a common issue in Sub-Saharan Africa's medical training programs. This competition restricts students' hands-on experience, hindering their ability to apply theoretical knowledge in real-world settings (Mullan et al., 2011). Research on student-related factors affecting clinical learner support in Nairobi's middle-level colleges found that limited clinical opportunities compound pedagogical difficulties and student engagement issues (Omondi et al., 2024).

Assessment challenges and financial constraints were the least reported barriers (4.2% and 4.7% respectively), though these remain significant concerns given the resource-intensive nature of competency-based assessment. The lack of standardized tools like portfolios limits tutors' ability to evaluate competencies comprehensively, a challenge noted in African CBME programs where assessment frameworks are often underdeveloped (Curry & Docherty, 2017). Financial constraints restrict investments in simulation labs essential for Objective Structured Practical Examination (OSPE) and practical training, forcing reliance on theoretical

assessments that undermine ICBME's competency-focused approach (Lolepo et al., 2024).

The pattern of challenges identified reflects complex, interconnected barriers facing ICBME implementation in resource-constrained settings. The predominance of resource-related challenges over pedagogical or attitudinal barriers suggests that infrastructural and systemic investments must precede or accompany curriculum reform initiatives. This hierarchy aligns with the WHO Regional Office for Africa's recent emphasis on addressing outdated curricula, inadequate training infrastructure, and mismatched competencies in health professions education as prerequisites for achieving Universal Health Coverage (World Health Organization, 2024). The convergence of tutor and student perceptions across all challenge categories indicates shared recognition of implementation barriers, suggesting potential for collaborative problem-solving approaches that engage both groups in developing contextually appropriate solutions.

Opportunities Promoting ICBME Implementation

The study also assessed opportunities that support the implementation of ICBME. Table 4 presents the frequencies and percentages of responses from tutors and students.

Table 4: Opportunities Promoting ICBME Implementation

Opportunity	Tutors (f)	Tutors (%)	Students (f)	Students (%)
Government Support	17	20.8	55	21.3
Healthcare Partnerships	17	20.8	52	20.2
Technological Advancements	14	16.7	44	17.1
Faculty Development	10	12.5	34	13.2
Demand for Professionals	7	8.3	20	7.8
Research and Innovation	7	8.3	23	8.9

Government support and healthcare partnerships emerged as the most prominent opportunities for ICBME implementation, each recognized by approximately 20% of both tutors and students. Kenya's Universal Health Coverage (UHC) policy prioritizes the development of a skilled healthcare workforce, providing funding and regulatory support for curriculum reforms that align with ICBME's competency-based approach (KICD, 2016; Ministry of Education, 2023). These reforms facilitate the integration of practical training methods like Community-Based Education and Service (COBES), which expose students to real-world healthcare settings, enhancing their clinical skills. The government's commitment to health workforce development is further evidenced by the Nursing Council of Kenya's collaborative initiatives with international partners such as the Liverpool School of Tropical Medicine to strengthen competency-based Emergency Obstetrics and Newborn Care training (Ige et al., 2024).

Healthcare partnerships reflect the potential for collaborative arrangements with hospitals, community health facilities, and international institutions to enhance clinical training opportunities. The AMPATH Consortium model at Moi University demonstrates the transformative potential of such partnerships, facilitating exchange programs for Kenyan medical students in North America and bringing international expertise to local training sites (AMPATH Kenya, 2025). Similarly, the Partnership

for Education of Health Professionals (PEP) initiative, launched in Kenya in 2024 with Kenya Medical Training College as a key partner, aims to strengthen quality education on communicable and non-communicable diseases, faculty training, and research capacity through institutional collaboration (Novo Nordisk Foundation, 2025). These partnerships address critical gaps in clinical exposure and faculty development, offering scalable models for ICBME implementation. Focus group discussions emphasized the clinical benefits of these partnerships, noting improved opportunities for community-based training through COBES. The close alignment between tutor and student agreement on opportunities reflects shared optimism, reinforcing the reliability of these findings and suggesting strong stakeholder buy-in for reform initiatives (Nsengimana et al., 2020).

Technological advancements were identified by 16.7% of tutors and 17.1% of students as significant opportunities, including e-learning platforms and simulation labs that enable experiential learning a core principle of social constructivism that fosters active knowledge construction (Vygotsky, 1978). A recent needs assessment across Eastern and Southern Africa found that educational technology is increasingly being used for online platforms, anatomy resources, virtual meetings, and clinical simulations, with students particularly valuing the flexibility, access to global resources, and improved understanding that technology facilitates (Frantz et al., 2024). The COVID-19 pandemic accelerated technology adoption in Kenyan medical training institutions, exposing both vulnerabilities and opportunities for remote and blended learning modalities (Frantz et al., 2024). However, structured interviews highlighted that these technological advancements are constrained by connectivity issues in rural campuses, a challenge also noted in African CBME contexts where infrastructure deficits limit the potential of educational technology (Akinrinola et al., 2021). The high agreement on opportunities among stakeholders aligns with successful CBME programs where technology and partnerships drive pedagogical reform (Kiguli-Malwadde et al., 2014).

Faculty development programs were cited by 12.5% of tutors and 13.2% of students, addressing training gaps by equipping tutors with skills in Problem-Based Learning (PBL) and Objective Structured Clinical Examination (OSCE), essential for effective ICBME delivery (Curry & Docherty, 2017). The PEP initiative specifically targets faculty training to strengthen pedagogical skills, didactics, and online teaching methods, recognizing that educators are central to successful curriculum reform (Novo Nordisk Foundation, 2025). This emphasis aligns with findings from across Africa that poor knowledge of CBE pedagogical approaches among educators is a primary barrier to implementation, and that targeted faculty development can significantly enhance curriculum delivery (Ige et al., 2024). Focus groups noted that partnerships with hospitals provide adjunct faculty, alleviating shortages and enhancing clinical training opportunities. However, structured interviews revealed that faculty development workshops, while valuable, are limited in scope, suggesting a need for broader training programs to fully realize ICBME's potential.

Demand for health professionals and research and innovation opportunities were the least frequently cited facilitators, each recognized by less than 10% of respondents. The modest recognition of workforce demand as an opportunity is notable given Kenya's

documented shortage of healthcare professionals and the critical need for competent graduates to achieve Universal Health Coverage (Asamani et al., 2024; Penprase, 2018). This finding may indicate that respondents perceive workforce demand as a background context rather than an active facilitator of educational reform. Research and innovation were identified by 8.3% of tutors and 8.9% of students as opportunities supporting the refinement of teaching methods like PBL and OSCE, fostering continuous improvement in medical education (Marcotte & Gruppen, 2022). However, the limited identification of research opportunities suggests that research culture may be underdeveloped in these training institutions, aligning with broader critiques of health professions education in Africa where research capacity is often constrained by limited funding, heavy teaching loads, and inadequate mentorship (Ige et al., 2024).

Perception Differences Between Tutors and Students on ICBME Implementation Challenges

To examine whether the perceptions of challenges facing ICBME implementation differed between tutors and students, a Chi-square test of independence was conducted. Table 5 presents the cross-tabulation of key challenges with respondent category and the associated Chi-square statistics.

Table 4: Chi-Square test of challenges facing ICBME implementation

Challenge	χ^2 Value	df	p-value
Inadequate Resources	0.10	1	0.75
Faculty Shortage	0.03	1	0.86
Large Class Sizes	0.02	1	0.88
Resistance to Change	0.08	1	0.78
Limited Clinical Opportunities	0.04	1	0.84
Assessment Challenges	0.01	1	0.91
Financial Constraints	0.01	1	0.91

The Chi-square results indicate that there were no statistically significant differences in the perceptions of ICBME challenges between tutors and students ($p > 0.05$). This suggests that both groups similarly identified barriers such as inadequate resources, faculty shortages, and large class sizes, reinforcing the reliability of the qualitative and quantitative findings reported earlier. The alignment of perceptions between tutors and students highlights systemic issues rather than differences in viewpoint due to role or experience, supporting the study's conceptual framework on challenges affecting ICBME adoption. These findings also justify the use of descriptive statistics for reporting frequencies while confirming that the trends are consistent across the respondent groups.

Conclusion

The findings reveal implementation challenge characterized by significant systemic barriers alongside promising enabling factors. Inadequate resources and infrastructure emerged as the predominant challenge, affecting approximately three-quarters of both tutors and students, and forcing reliance on traditional lecture-based methods that undermine the experiential learning central to ICBME. Faculty shortages, large class sizes, limited clinical opportunities, resistance to change, assessment challenges, and financial constraints constitute additional barriers impeding

the transition to competency-based education. However, government support through Universal Health Coverage policies and healthcare partnerships emerged as the most prominent facilitators, recognized by approximately 20% of respondents, while technological advancements, faculty development programs, workforce demand, and research capacity present additional avenues for strengthening ICBME adoption. Tutors and students' perceptions across both challenges and opportunities evidenced by non-significant Chi-square test results indicates shared stakeholder experiences.

Recommendations

Policy and Resource Allocation

The Kenyan government, through the Ministry of Health and Ministry of Education, should prioritize substantial investment in health training infrastructure to address the resource deficits impeding ICBME implementation. This includes equipping KMTC campuses with simulation laboratories, ICT facilities, and adequate clinical training sites essential for competency-based education. The Presidential Working Party on Education Reform recommendations should be operationalized with dedicated funding streams for health professions education, ensuring that policy commitments translate into tangible resource allocation. County governments in Western Kenya should collaborate with national agencies to identify and develop community-based clinical training sites, decentralizing clinical education beyond tertiary hospitals to enhance COBES implementation and address placement shortages.

Faculty Development and Employment

KMTC should implement comprehensive faculty development programs that equip tutors with specialized training in competency-based pedagogies, including Problem-Based Learning facilitation, Objective Structured Clinical Examination administration, and student-centered assessment methods. These programs should move beyond limited-scope workshops to sustained, iterative professional learning that enables educators to reconstruct their teaching practices and professional identities in alignment with ICBME principles. The high proportion of contract employment among tutors (66.7%) should be addressed through conversion to permanent positions where possible, enhancing job security and institutional commitment essential for sustained curriculum reform. Partnerships with international institutions, such as the Liverpool School of Tropical Medicine and the PEP initiative, should be expanded to provide external expertise and mentorship for faculty capacity building.

Technology-Enhanced Education

KMTC should strategically leverage technological advancements to support ICBME implementation, while simultaneously addressing connectivity and hardware limitations in rural campuses. This includes investing in reliable internet infrastructure, providing adequate devices for students and faculty, and developing locally relevant digital learning resources that align with competency-based objectives. E-learning platforms should be integrated as complements to, rather than replacements for, hands-on clinical training, ensuring that technology enhances rather than dilutes practical skill development. Collaboration with regional initiatives, such as the technology-enhanced health professions education networks in Eastern and Southern Africa, can facilitate knowledge exchange and resource sharing.

Stakeholder Engagement and Change Management

Given the identified resistance to change among some educators, KMTC should implement participatory change management strategies that engage tutors as active agents in curriculum reform rather than passive recipients of top-down mandates. This includes creating professional learning communities where educators can collectively negotiate meanings, share challenges, and develop contextually appropriate solutions. Student voices should be systematically incorporated into curriculum governance structures, leveraging their high engagement and shared perceptions to drive reform momentum.

Monitoring and Evaluation

A robust monitoring and evaluation framework should be established to track ICBME implementation progress, identify emerging challenges, and assess graduate outcomes. This framework should include indicators related to resource availability, faculty competency, student performance, and graduate workplace readiness, with regular reporting mechanisms that inform iterative program improvement. The convergence of tutor and student perceptions documented in this study should be periodically reassessed to detect any emerging divergences that might indicate implementation drift or unequal stakeholder experiences.

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