

Technological Factors Associated with Faculty Development in Health Professions Education Across Kenya Medical Training College Campuses in Coastal Kenya.

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Abstract

Faculty development is vital for quality health professions education. Yet in resource-constrained settings, weak technological capacity limits professional growth. This study sought to establish the technological factors associated with faculty development in health professions education across KMTC Coastal Region campuses, alongside environmental and cultural factors measured for comparison. A cross-sectional correlational design was used, targeting 300 staff from eight campuses. Using Fisher's formula with a finite population correction, a sample of 169 respondents was selected. Data were collected via a self-administered questionnaire with validated Likert-scale items. Quantitative data were analyzed using descriptive statistics, Pearson correlation, and multiple linear regression with SPSS version 30; qualitative data were analyzed thematically. The questionnaire return rate was 100% (n=169); item-level analytical samples ranged from 162 to 168. Cronbach's alpha exceeded 0.70 for all three predictor scales. A three-item Faculty Development Index was operationalized from behavioral outcomes structurally independent of the predictor scales: receipt of research funding, external institutional collaboration, and attendance of cultural competence training. Technological factors were rated moderate-to-low (M=2.60, SD=0.61); environmental factors were rated moderate (M=2.89, SD=0.65); and cultural factors were rated moderate (M=2.83, SD=0.55). All three factors showed statistically significant positive correlations with the Faculty Development Index. In multiple regression, only technological factors retained a statistically significant independent association with the Faculty Development Index ($\beta=.335$, $p<.001$). Perceptions of technological adequacy differed significantly by designation ($F(3,162) = 5.342$, $p=.002$, $\eta^2=.090$). Qualitative themes confirmed three barriers: inadequate institutional policy frameworks, inequitable research funding, and weak digital infrastructure and training capacity. The study concludes that technological capacity showed the strongest adjusted association with faculty development at KMTC Coastal Region campuses. It is recommended that KMTC management and development partners invest in ICT infrastructure and structured digital literacy training across all campuses and second, that research funding allocation criteria be made transparent and equitable.

Keywords: *Faculty development, Technological factors, Digital literacy, Hybrid learning, Health professions education*

1.0 Introduction

Faculty development in health professionals' education is a critical component of ensuring quality teaching and effective learning within the healthcare sector (Van Staden, 2021). Faculty development encompasses the structured activities, programs and processes that support educators in improving their teaching effectiveness, research capacity and professional competence (Steinert et al., 2016). In health professions education, it is foundational to producing competent graduates and sustaining educational quality. Where faculty development is weak, educational outcomes are compromised (Frantz et al., 2019). In academic higher education and health professions contexts, "Faculty" refers strictly to the academic teaching, training, and research personnel (i.e., Lecturers, Tutors, and Clinical Instructors/Trainers). However, in this study, 'faculty' is used broadly to refer to all KMTC staff cadres involved in or supporting the training function Senior Management, Lecturers & Trainers, Administrative Staff, and Support Staff rather than teaching staff alone.

Technology has increasingly become central to how faculty development is planned and delivered. Digital technologies, e-learning platforms, blended and gamified learning materials have become commonplace in health professions education throughout the world (Jeffries et al., 2022). However, access to these tools is not quite even. For instance, in many low- and middle-income countries (LMICs), including Kenya, limited ICT infrastructure, low digital literacy and inadequate training have constrained the adoption of technology-enhanced faculty development (Barasa, 2021; Chipamaunga et al., 2025).

Kenya Medical Training Colleges (KMTC) is the largest public provider of health professionals in Kenya. It is estimated that this institution trains over 28,000 students annually across 29 disciplines (KMTC, 2018). In the Coastal Region, there are eight campuses, namely Kilifi, Kwale, Lamu, Mombasa, Msambweni, Taveta, Tana River, and Voi. These campuses are located in counties with historically limited resources. Despite this, little is known about the technological conditions that shape faculty development in this setting.

Existing literature on faculty development that deals with teacher development in Africa mainly centers on teaching practice and mentorship (Frantz et al., 2019). Very few have looked into the specific contribution of technology as a catalyst for faculty development in public health training institutions, especially in the Kenyan coastal setting. This gap restricts the ability of the policy- and institution makers to design targeted technological interventions.

The theoretical framework that guided this study is the Social Cognitive Theory developed by Albert Bandura. SCT is a learning theory that explains how people acquire and maintain certain behaviors through a dynamic and continuous interaction between personal, behavioral, and environmental influences (Bandura, 2014). As the foundational principle of SCT, reciprocal determinism states that behavior, personal factors (such as beliefs, attitudes, or skills), and environmental factors all influence one another in a continuous loop (Bandura, 2014). This idea is particularly applicable to faculty development in KMTCs.

In applying Bandura's model to the empirical scope of this study, the constructs are directly mapped onto the study's core variables.

Environmental factors encompass both the institutional and operational environmental factors (X_1), such as clear support policies, research funding allocation, and inter-institutional networking) and the organizational cultural factors (X_2), such as workplace diversity, bias awareness, and inclusive mentorship). These external dimensions represent the organizational climate and administrative ecosystem provided by the Kenya Medical Training College. Personal or cognitive factors map directly to the technological factors (X_3), specifically digital literacy, technical capability, and educator self-efficacy with e-learning tools). This cognitive dimension reflects how individual staff members process environmental resources and develop confidence in adopting modern instructional technologies. Finally, the behavioral outcome represents the dependent variable, faculty development (Y).

“This study found that all three factors environmental, cultural and technological were positively associated with faculty development”

This study therefore sought to establish the technological factors associated with faculty development in health professions education across KMTC Coastal Region campuses, alongside environmental and cultural factors measured for comparison. Specifically regarding the technological domain, it examined four sub-constructs: digital literacy training, hybrid learning models, technology resource access, and gamified learning tools. The study also operationalized a Faculty Development Index from three behavioral outcomes; research funding

receipt, external collaboration, and attendance of cultural competence training; each structurally independent of the three predictor scales, to reduce the risk of circularity in the analysis.

2.0 Materials and Methods

Research Design

A correlational research design was used in this study. This design was appropriate because the study sought to examine the associations between technological factors and faculty development, without manipulating any variable, across several campuses within the same study period (Devi et al., 2022). It was appropriate for studying naturally occurring patterns on several campuses during the same study period.

Study Setting, Population, and Eligibility

The study was carried out in eight KMTC campuses in the Coastal Region of Kenya namely; Kilifi, Kwale, Lamu, Mombasa, Msambweni, Taveta, Tana River and Voi. Data collection took place from May to June 2026. The target population comprised 300 staff. These campuses were selected because of observed variations in technology access and use compared to better-resourced campuses elsewhere in Kenya. Eligible participants were currently employed at one of the eight campuses, had served for six months or more, and provided written consent. Staff on long-term leave, interns, volunteers and temporary employees were excluded.

Sample Size and Sampling

Using Fisher’s formula (initial $n=384$) with a finite population correction for $N=300$, a final sample of 169 was obtained (Sathian et al., 2010). The stratified random sampling method was used to select the participants proportionately from each cadre so that there is an equal representation of the four staff groups. Larger cadres contributed

proportionately more respondents, rather than each cadre being equally represented. Specifically, Senior Management (n=26, 15.4%), Lecturers/Trainers (n=74, 43.8%), Administrative Staff (n=45, 26.6%) and Support Staff (n=24, 14.2%).

Data Collection Instrument and Operationalization

Data was collected using a self-administered questionnaire with closed ended Likert scale items and open-ended questions. Items on the Likert scale were answered on a 5-point scale, ranging from 1=Strongly Disagree to 5=Strongly Agree. The technological factors section had eight Likert items covering the four sub-constructs, and two categorical (Yes/No) items on actual receipt of digital training and comfort with hybrid delivery. Environmental Factors section had eleven 5-point Likert items spanning institutional policy, faculty engagement, research funding allocation, and collaboration/networking sub-objectives and Cultural Factors section had ten 5-point Likert items spanning cultural-competence training, bias awareness, inclusive policy, and mentorship/diversity sub-objectives. All 169 distributed questionnaires were returned (100% questionnaire-level response rate); individual item completion ranged from 158 to 169 valid responses (93.5–100%) because of sporadic item-level non-response within returned questionnaires. This distinction between questionnaire-level and item-level response is reported explicitly wherever descriptive statistics are presented.

The Faculty Development Index (FD Index) was constructed from three behavioral/outcome items that are structurally independent of all three predictor scales: (1) whether the respondent received research funding in the last two years; (2)

whether they collaborated with an external institution on an academic project; and (3) whether they attended a cultural competence training session. Responses were coded Yes=1.0, Maybe=0.5, No=0.0, and averaged to produce a score ranging from 0 to 1. These three items were selected because they capture concrete professional development activities without overlapping with the attitudinal items used to measure the predictors, thereby avoiding circularity. The inter-item correlations were positive and significant ($r=.296$ to $.518$, all $p<.001$).

Reliability and Validity

Content validity was established through expert review by nursing education and medical training specialists. Face validity was assessed through review by academic peers and a small pilot group. Cronbach's alpha coefficients confirmed acceptable internal consistency: Technological Factors $\alpha=0.864$, Environmental Factors $\alpha=0.918$, and Cultural Factors $\alpha=0.84$, all exceeding the 0.70 threshold (Taherdoost, 2016).

Data Analysis

SPSS version 30 and Microsoft Excel software were used for data analysis. Descriptive statistics (frequencies, means, and standard deviations) were computed for all items. Mean scores were classified as Low (1.00–2.33), Moderate (2.34–3.67) or High (3.68–5.00), following Mugenda and Mugenda (2003). Pearson's product-moment correlation was used to assess bivariate associations between predictors and the FD Index. Multiple linear regression (enter method) was used to estimate the independent association of each factor with the FD Index, controlling for the other two. Variance inflation factors (VIF) and tolerance values were inspected for multicollinearity. The Durbin-Watson statistic

was used to assess residual autocorrelation. One-way ANOVA with Tukey HSD post-hoc comparisons and eta-squared (η^2) effect sizes was used to examine differences in factor scores by designation. Open-ended responses were analyzed using thematic analysis: responses were read iteratively, initial codes were generated inductively, and codes were grouped into broader themes aligned with the study's research objectives. Significance was set at $\alpha=.05$.

Ethical Considerations

Ethical approval was obtained from the Kenya Methodist University Institutional Ethics Review Committee (KEMU/ISERC/MSN/01/2026) and a research permit was issued by the National Commission for Science, Technology and Innovation (NACOSTI/P26/4186518). Authorization to collect data was granted by KMTC headquarters (Ref No: KMTC/ADM/74/VOL, VI (596)) to collect data from all eight coastal regional campuses. Written informed consent was obtained from all participants, and confidentiality was maintained through anonymous questionnaire coding.

Digital Literacy Training

Table 1

Digital Literacy Training (Technological Factors - Sub-construct 1)

Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev.	Level
Digital literacy training is prioritized by the institution.	167	1.2	52.1	30.5	12.0	4.2	2.66	0.86	Moderate

Note. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree. Level bands: Low 1.00–2.33, Moderate 2.34–3.67, High 3.68–5.00.

3.0 Results and Discussion

Participant Characteristics

A total of 169 questionnaires were returned (100% return rate). Item-level analysis samples ranged from 162 to 168 due to occasional non-response on specific items. This distinction is maintained throughout the analysis. When it comes to demographic findings, the respondents were predominantly male (63.3%) relative to female (35.5%), a pattern most pronounced among Lecturers/Trainers but reversed among Senior Management, where women were the majority. Most respondents (81.0%) were aged between 30 and 49 years, reflecting a largely mid-career workforce, and the majority (92.2%) had served at KMTC for two years or more, with the largest single group having served 6-10 years. Lecturers/Trainers formed the largest cadre (44.0%), and nearly half of all respondents (48.5%) held a postgraduate qualification. Respondents were well distributed across the eight campuses, with Voi, Mombasa and Kwale contributing the largest shares.

Descriptive Statistics: Technological Factors

This section presents descriptive statistics for the four technological-factor sub-constructs: digital literacy training, hybrid learning models, technology resource access, and gamified learning tools. Overall, technological factors were rated moderate-to-low ($M = 2.60$, $SD = 0.61$, $n = 167$).

The first sub-construct studied was digital literacy training. Majority of respondents (53.3%) disagreed that digital literacy training was a priority of their institution ($M=2.66$, $SD=0.86$). 29.5% of staff reported that they had received digital skills training relevant to their teaching while 70.5% did not. Academic qualification was significantly related to digital training ($\chi^2=10.875$,

$df=4$, $p=.028$). Among PhD holders, 58.3% had received training compared to only 16.2% of Diploma holders. This implies more highly qualified staff were more likely to be able to access or take up digital training. This means that the majority of KMTC staff in the Coastal Region have neither received, nor perceive their institution as prioritizing, digital literacy training.

Table 2

Digital-Training Receipt $\times$ Qualification (Cross-tabulation)

Qualification	No, n (%)	Yes, n (%)	Row Total
Bachelor's Degree	36 (76.6%)	11 (23.4%)	47
Diploma	31 (83.8%)	6 (16.2%)	37
Master's Degree	43 (63.2%)	25 (36.8%)	68
PhD	5 (41.7%)	7 (58.3%)	12

Note. $n = 164$ (listwise, excludes missing qualification/training-receipt responses). $\chi^2(3, N=164) = 10.41$, $p = .015$, Cramér's $V = .252$.

This finding aligns with Barasa (2021), who found that fewer than 40% of Kenyan educators felt confident using digital platforms, linking this to digital inequality and the absence of national training standards. Chipamaunga et al. (2025) similarly found that only 35% of health

professions educators across Eastern and Southern Africa had received formal digital literacy training, a figure close to the 29.5% found in this study. These convergent findings suggest that the gap in digital training is not unique to KMTC but reflects a broader regional challenge.

Hybrid Learning Models

Table 3

Hybrid Learning Models (Technological Factors - Sub-Construct 2)

Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev.	Level
Hybrid learning is integrated in my course delivery.	166	2.4	59.0	20.5	15.1	3.0	2.57	0.88	Moderate
I have access to platforms that support blended learning.	165	1.8	55.8	25.5	14.5	2.4	2.60	0.85	Moderate

Note. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree. Level bands as in Table 2.

Hybrid learning models were rated the second lowest sub-construct ($M=2.58$, $SD=0.79$). The majority of respondents did not agree that hybrid learning was part of the course delivery (61.4% disagree; $M=2.57$; $SD=0.88$) and that they were provided with platforms for blended learning

(57.6% of them disagree; $M=2.60$; $SD=0.85$). Just 31.9% indicated that they feel comfortable with delivering a hybrid or blended learning session.

There was a significant difference in comfort with hybrid delivery based on designation ($\chi^2=14.633$, $df=3$, $p=.002$). Restricted to the instructional

cadre, comfort was higher: 41.7% of Lecturers/Trainers reported comfort. This means that hybrid and blended learning have not yet become an established mode of instructional delivery at Coastal Region KMTC campuses, both in terms of institutional integration and staff comfort.

Jeffries et al. (2022) observed that the transition to hybrid learning during and after the COVID-19

pandemic required that faculty, courses and classrooms be adequately prepared, a precondition not yet met at most KMTC campuses. Keiller et al. (2022) found in a rapid realist review that blended digital approaches were strongly linked to faculty engagement outcomes in LMICs, but only when properly supported by institutional investment. The near-absence of hybrid learning at KMTC therefore represents a missed opportunity.

Technology Resource Access

Table 4

Technology Resource Access (Technological Factors - Sub-construct 3)

Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev.	Level
I have access to up-to-date teaching technologies.	165	3.6	49.7	32.1	12.7	1.8	2.59	0.83	Moderate
My institution provides adequate ICT support.	163	0.0	55.8	28.2	14.1	1.8	2.62	0.80	Moderate

The majority of the respondents felt that they were not provided with updated teaching technologies (53.3%, M=2.59, SD=0.83) and they also felt that their institution did not give them adequate support in terms of ICT (55.8%, M=2.62, SD=0.80)).

This means that resource and infrastructural limitations, rather than outright absence of any ICT provision, characterize the technology environment at KMTC Coastal Region campuses. This is consistent with Al-Worafi (2024), whose narrative synthesis of technology use in public health education across developing countries found that while mobile and web-based platforms have improved access to continuing professional development, many institutions continue to face persistent barriers such as unstable electricity,

limited internet bandwidth and inadequate training for digital teaching methods. It similarly aligns with Barasa (2021), who recommended improved funding for IT infrastructure in public training institutions such as KMTC as a precondition for closing Kenya's digital divide in education.

This was supported by qualitative responses. Specific examples given included 'poor and slow Wi-Fi connectivity' and 'inadequate departmental resources, including projectors'. The technology barrier was mentioned by one respondent, who added: 'Limited digital skills of KMTC educators, inadequate ICT infrastructure, lack of time to prepare content, and funding issues,' capturing the multi-layered nature of the technological barrier.

Gamified Learning Tools

Table 5

Gamified Learning Tools (Technological Factors - Sub-construct 4)

Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev.	Level
I use gamified tools to enhance learner engagement.	162	25.9	40.1	19.1	11.1	3.7	2.27	1.08	Low
I am trained to use interactive learning software or games.	163	4.3	52.8	27.6	14.7	0.6	2.55	0.82	Moderate
My institution encourages innovation in instructional delivery.	165	1.8	32.7	40.6	22.4	2.4	2.91	0.85	Moderate

Note. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree. Level bands as in Table 2.

Gamified learning tools were the lowest-rated sub-construct ($M=2.57$, $SD=0.67$), and the item on actual use of gamified tools to enhance learner engagement ($M=2.27$, $SD=1.08$) was the single lowest-rated item of all 29 items in the study, with 66.0% in disagreement. The one exception was the item on institutional encouragement for innovation, which was more moderately rated ($M=2.91$), revealing disconnect between rhetorical encouragement and practical implementation.

This is a similar discovery to that of Chipamaunga et al. (2025) who observed that the use of gamified and interactive pedagogical methods in Eastern and Southern Africa is still largely underutilized, even though they are proven to be very effective, as both institutional support and digital infrastructure are limited. Yilmaz et al. (2020) pointed out that gamified content is one of the rising approaches for enhancing engagement in the development of faculty in health sciences across the world, and KMTC remains far behind other institutions, particularly those with more resources, that are using these tools.

Descriptive Statistics: Environmental and Cultural Factors

Environmental factors were rated moderate ($M=2.89$, $SD=0.65$, $n=168$; $\alpha=0.918$). Institutional support policies ($M=2.74$) and research funding allocation ($M=2.83$) were the weakest sub-constructs. Only $n=12$ (7.1%) of respondents had actually received research funding in the last two years, despite $n=80$ (47.3%) agreeing that funding opportunities existed, highlighting a gap between stated provision and actual access. Cultural factors were also moderate ($M=2.83$, $SD=0.55$, $n=168$; $\alpha=0.849$). Cultural competence training was the most favorably perceived item ($M=3.38$), but only $n=31$ (18.5%) had actually attended such training, reflecting a similar intent-delivery gap. Bias awareness initiatives ($M=2.75$) and inclusive institutional policies ($M=2.69$) were the weakest cultural sub-constructs.

Correlation Analysis

All three factors showed statistically significant positive correlations with the FD Index (Table 6). Technological factors had the strongest association ($r=.478$, $p<.001$), followed by cultural ($r=.425$, $p<.001$) and environmental ($r=.322$, $p<.001$). The three predictors were also

significantly inter-correlated with one another ($r=.417$ to $.673$), with the strongest inter-correlation between cultural and technological

factors ($r=.673$, $p<.001$). All VIF values in the regression model were below 2.1, confirming that multicollinearity was not a concern.

Table 6

Pearson Correlation Matrix

Variable	1	2	3	4
1. Environmental Factors	1.000			
2. Cultural Factors	.519***	1.000		
3. Technological Factors	.417***	.673***	1.000	
4. FD Index	.322***	.425***	.478***	1.000

Note. *** $p<.001$ (two-tailed).

Multiple Regression Analysis

The three factors jointly accounted for 25.8% of the variance in the FD Index ($R^2=.258$, Adjusted $R^2=.245$, $F(3,163)=18.916$, $p<.001$, Durbin–Watson=1.960). Examination of the coefficients (Table 3) shows that only technological factors retained a statistically significant independent association with the FD Index ($\beta=.335$, $B=0.155$, $SE=0.043$, $t=3.657$, $p<.001$). Environmental ($\beta=.114$, $p=.152$) and cultural factors ($\beta=.141$, $p=.149$) did not reach significance once technological factors were included. All VIF values were below 2.1 and tolerance values above 0.2, confirming no multicollinearity problem.

This finding suggests that, among the three domains studied, the technological conditions

under which faculty operate had the most consistent independent association with their engagement in professional development activities. This aligns with Barasa (2021), who identified inadequate ICT infrastructure as the primary constraint on faculty engagement in Kenya, and with Moro et al. (2020), who argued that institutional technology access shapes the professional development opportunities available to educators more than the general institutional climate alone. The association, while statistically significant, is modest in magnitude and should be interpreted in the context of the study’s cross-sectional design and the composite nature of the FD Index.

Table 7

Multiple Regression Coefficients (Dependent Variable: FD Index, $n=167$)

Predictor	B	SE	β	t	p	Tolerance	VIF
(Constant)	-0.557	0.109	-	-5.095	<.001	-	-
Environmental Factors	0.050	0.035	0.114	1.438	.152	0.721	1.386
Cultural Factors	0.073	0.051	0.141	1.450	.149	0.478	2.093
Technological Factors	0.155	0.043	0.335	3.657	<.001	0.541	1.849

Note. $R^2=.258$, Adjusted $R^2=.245$, $F(3,163)=18.916$, $p<.001$, Durbin–Watson=1.960.

Differences in Technological Factor Perceptions by Designation

Perceptions of technological adequacy differed significantly across cadres ($F(3,162)=5.342$, $p=.002$, $\eta^2=.090$). Senior Management reported the most favorable perceptions ($M=2.88$, $SD=0.56$, $n=26$), followed by Lecturers/Trainers ($M=2.64$, $SD=0.69$, $n=73$) and Administrative Staff ($M=2.59$, $SD=0.51$, $n=45$). Support Staff reported the least favorable perceptions ($M=2.20$, $SD=0.30$, $n=22$). Tukey HSD post-hoc comparisons showed that Support Staff scored significantly lower than Lecturers/Trainers (mean difference= -0.437 , $p=.015$) and Senior Management (mean difference= -0.676 , $p<.001$). These cadre differences likely reflect differences in occupational role and associated technology access rather than simple inequality; Support Staff roles typically require less digital instructional engagement, and access to campus ICT resources may not be uniformly extended to all cadres. This finding is consistent with Frantz et al. (2019), who noted that faculty development resources in resource-constrained African institutions tend to be concentrated among teaching cadres.

The FD Index also differed significantly by designation ($F(3,163)=5.415$, $p=.001$, $\eta^2=.091$). Senior Management reported the highest FD Index scores ($M=0.327$, $n=26$), followed by Administrative Staff ($M=0.278$, $n=45$), Lecturers/Trainers ($M=0.133$, $n=74$) and Support Staff ($M=0.106$, $n=22$). Tukey HSD comparisons showed that Senior Management scored significantly higher than Lecturers/Trainers ($p=.012$) and Support Staff ($p=.030$), and Administrative Staff scored significantly higher than Lecturers/Trainers ($p=.029$). These patterns may partly reflect differential access to research funding and external collaboration networks, which formed two of the three FD Index items.

Qualitative Data Analysis

Open-ended responses complemented and deepened the quantitative findings. Thematic analysis of open-ended responses identified four themes corresponding to the study's objectives.

Theme 1: Inadequate Institutional Policy and Environmental Support. Respondents described uneven policy implementation across campuses, barriers to research funding access, and workload constraints limiting development engagement. Representative responses included: "heavy workload deters time for further studies" and "turned down by sponsors thus incomplete research projects." (R025 and R076). This is consistent with Wangai (2022) and Frantz et al. (2015), who found that institutional support often exists in policy but not in practice.

Theme 2: Limited Cultural Competence and Inclusion Structures. Most respondents had not attended formal cultural competence training. Cultural sensitivity was largely self-developed: "my interactions with students from diverse backgrounds have helped me develop inclusive teaching practices." (R097). Lewis and Steinert (2020) identified the same gap globally.

Theme 3: Weak Digital Infrastructure and Technological Capacity. Respondents described polarized digital experiences, physical resource constraints, and near-absent gamification: "poor and slow Wi-Fi connectivity and inadequate departmental resources such as projectors;" "limited digital skills, inadequate ICT infrastructure, lack of time to develop content, and funding constraints." (R015). This aligns with Barasa (2021) and Chipamaunga et al. (2025).

Theme 4: Demand for Structured, Blended and Technology-Driven Development. Respondents consistently called for flexible, blended training delivery, protected time and mentorship: "KMTC

should strengthen faculty development through structured, continuous training delivered in flexible blended formats.” (R052). This mirrors recommendations by Steinert et al. (2016) and Keiller et al. (2022).

Strengths and Limitations

Strengths of this study include the 100% questionnaire return rate, coverage of all eight Coastal Region KMTC campuses, the use of validated multi-item scales with strong internal consistency, and the separation of the Faculty Development Index from the predictor scales to reduce circularity. A limitation is the cross-sectional design, which precludes causal inference; the associations reported should not be interpreted as effects. The composite FD Index, while structurally independent of the predictor scales, is based on only three behavioral proxy items and may not capture the full range of faculty development engagement. Common-method variance is a potential concern, as both predictor and outcome data were collected simultaneously from the same respondents via self-report. Campus clustering was not formally modelled.

4.0 Conclusion

This study found that all three factors environmental, cultural and technological were positively associated with faculty development at KMTC Coastal Region campuses. In adjusted analysis, only technological factors retained a statistically significant independent association, while environmental and cultural factors did not reach significance once technological factors were accounted for. The Faculty Development Index was low across the sample, with most respondents having not accessed research funding, not collaborated externally, and not attended cultural competence training. Perceptions of technological adequacy differed significantly by designation,

with Support Staff reporting the least favorable perceptions. These findings point to technological infrastructure and training as a priority area for attention, alongside strengthened policy implementation, transparent research funding, and formalized cultural competence training.

5.0 Recommendations

Based on these findings, the following recommendations are made with their value and implications for practice:

First, and most urgently, the Ministry of Health and KMTC headquarters should allocate dedicated funding for ICT infrastructure upgrades at all eight Coastal Region campuses, prioritizing reliable internet connectivity, digital teaching equipment and e-learning platform access. Campus principals should ensure that digital literacy training is provided to all staff cadres within a structured, scheduled program, with particular attention to cadres that currently report the lowest technological access. This recommendation is given first priority because technological factors showed the strongest and only statistically significant independent association with faculty development in this study.

Second, KMTC headquarters should develop and publish transparent, documented criteria for research funding allocation, and ensure that these criteria are formally communicated to all staff through campus principals. The finance department should maintain accessible records of funding opportunities, application outcomes and award distribution. Campus principals should be held accountable for ensuring their staff are informed of available opportunities. This recommendation is given second priority because only 7.1% of respondents had received research funding in the last two years, despite 47.3%

acknowledging that funding opportunities existed, indicating a systemic gap between policy and access.

Future research should employ longitudinal designs to establish directionality in the associations identified here, develop and validate

a dedicated multi-item Faculty Development outcome scale, conduct campus-level analyses to account for clustering, and extend comparative investigation to other KMTC regions to assess whether these patterns reflect a broader national trend.

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