

Enhancing professional development in Ghanaian colleges of education: A critical analysis of needs assessment practices

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ABSTRACT

The study investigated the predictors of professional development (PD) needs assessment in Ghana's Colleges of Education (CoEs), prompted by growing concerns about the alignment between institutional development efforts and actual educator needs. Despite widespread discourse on professional development in education, few studies have systematically explored how PD needs are assessed within the unique institutional settings of Ghana's CoEs. This study addressed that gap by examining the structural, task-specific, and individual-level factors influencing the effectiveness of needs assessments. Guided by Kaufman's Organizational Elements Model and the Three-Level Needs Assessment Model, the research adopted a quantitative approach, employing a cross-sectional descriptive design. A sample of 610 lecturers, drawn through multistage sampling from 13 CoEs across Ghana, participated in the study. Data were collected using a structured questionnaire, piloted and refined to ensure validity and reliability. Exploratory Factor Analysis (EFA) was used to explore the latent dimensions shaping PD needs whereas the multiple regression analysis was performed to examine how organizational, task-related, and individual-level variables predicted PD assessment outcomes. A key finding revealed that institutional policy clarity significantly predicted the perceived relevance and utility of PD needs assessments, suggesting that structural coherence enhances the identification of educators' developmental priorities. The study concludes that effective PD planning in CoEs requires greater institutional alignment and recommends that leadership structures embed clearer frameworks to standardize and optimize needs assessment practices.

Keywords: Education Quality, Ghanaian Colleges of Education, Needs Assessment, Organizational Factors, Personal Factors, Professional Development, Task Analysis

I. INTRODUCTION

Professional development (PD) remains a cornerstone of educational reform, widely acknowledged as a strategic means to improve teacher quality, enhance instructional effectiveness, and ultimately raise student achievement (Desimone & Garet, 2015; Darling-Hammond et al., 2017). In many educational systems, PD is not merely an ancillary support mechanism but a critical component of systemic improvement. It serves as a platform for continuous learning, equipping educators with the skills and competencies required to meet evolving curricular standards, technological advancements, and the diverse needs of learners (Opfer & Pedder, 2011). Within the Ghanaian context, the transformation of teacher education has received renewed attention, particularly following the conversion of Colleges of Education (CoEs) into tertiary institutions with expanded mandates for pre-service training and research (Ministry of Education [MoE], 2018). As the primary institutions responsible for preparing basic school teachers, CoEs occupy a central position in national education reforms. However, aligning PD initiatives with institutional goals and educators' practical realities remains a significant concern. The quality, relevance, and responsiveness of PD opportunities offered in these settings often fall short of supporting meaningful professional growth (Donkor, 2020; Osei-Owusu, 2021).

One key dimension that continues to attract scholarly interest is the assessment of PD needs, which is a foundational step that informs the design, implementation, and evaluation of PD programmes. The literature emphasises that needs assessment is vital for identifying gaps between current practices and desired competencies, ensuring PD is

targeted and impactful (Guskey, 2002; Avalos, 2011). Yet, in practice, many PD programmes in sub-Saharan Africa, including Ghana, tend to adopt a top-down approach that overlooks the voices and contextual realities of teachers (Pillay, 2021). This disconnect often leads to generic, one-size-fits-all interventions that do not reflect educators' differentiated experiences or institutional demands. Variables such as the perceived needs of teaching staff, the processes employed in PD needs assessment, and the institutional frameworks for PD planning play an instrumental role in shaping the effectiveness of professional development. Studies suggest that where participatory and data-driven approaches are absent, PD interventions risk becoming ritualistic rather than transformative (Kennedy, 2014; Osei-Owusu, 2021). Moreover, institutional cultures and administrative leadership also significantly influence how PD is conceptualised, resourced, and evaluated (Van den Bergh et al., 2015).

Despite growing attention to teacher capacity-building, there remains a dearth of empirical insight into how PD needs are systematically identified and integrated into institutional planning within Ghana's CoEs. Research in this area tends to focus more broadly on PD outcomes, with less attention to the diagnostic processes that underpin effective programme design (Akyeampong et al., 2013). This study, therefore, focuses on examining the current state of PD needs assessment practices among teaching staff in Ghanaian Colleges of Education. In doing so, it seeks to illuminate the degree to which institutional PD mechanisms are responsive, contextually grounded, and aligned with educators' evolving professional trajectories.

1.1 Statement of the Problem

Despite the acknowledged importance of professional development in improving teacher quality, there remains a significant disconnect between PD programmes offered in Ghanaian Colleges of Education and the actual developmental needs of educators. This misalignment is largely attributed to weak or inconsistent needs assessment practices that fail to systematically incorporate educators' perspectives, institutional demands, or role-specific requirements. In many cases, PD initiatives are designed and implemented without adequate grounding in empirical data or contextual realities, leading to interventions that are perceived as irrelevant or ineffective by teaching staff. Moreover, the absence of a coherent framework for needs assessment limits the ability of CoEs to respond adaptively to emerging trends in education. This gap presents a critical barrier to the professional growth of educators and, by extension, to the quality of instruction and learning outcomes in teacher education institutions. Addressing this problem requires an in-depth examination of the organizational, task, and personal dimensions influencing needs assessment processes, in order to propose more responsive and evidence-informed PD strategies. This research therefore interrogates the deficiencies within current needs assessment practices in Ghanaian CoEs, focusing specifically on the organizational structures, task demands, and personal attributes that shape their effectiveness. In a context where the professional capabilities of educators are vital to educational progress, enhancing the diagnostic accuracy of PD planning is essential. Better-aligned PD efforts can ultimately lead to more meaningful capacity building across the sector (Owusu-Cole et al., 2021).

The study aims to analyze the variables that shape needs assessment practices within Ghanaian CoEs, examining how organizational factors, role-specific demands, and individual educator characteristics influence the identification of professional development priorities. The significance of this inquiry lies in both its academic and practical implications. Theoretically, it contributes to the limited scholarship surrounding PD needs assessment in the Ghanaian context (Owusu-Ansah, 2020). Practically, it offers actionable insights for stakeholders involved in designing PD frameworks that are contextually relevant and educator-informed. Moreover, this work feeds into the broader regional discourse on professional learning across sub-Saharan Africa, where aligning PD with educators' needs continues to pose a systemic challenge (Kikaya, 2020; Opoku-Agyemang et al., 2021). Focusing exclusively on the processes used to determine PD needs rather than the content of PD programmes themselves, the study narrows its scope to ensure a detailed exploration of the underlying influences on needs assessment. By centering the perceptions and experiences of educators in CoEs, the research sheds light on how institutional, functional, and personal dimensions interact to either support or undermine effective PD planning. This study therefore seeks to confront the persistent challenge of poorly designed needs assessment processes in Ghanaian CoEs, which continue to limit the relevance and effectiveness of PD initiatives intended to support educators.

1.2 Research Questions

- (i) What are the underlying dimensions influencing the needs assessment process for PD in Colleges of Education in Ghana?
- (ii) To what extent do organizational, task, and personal analysis factors predict the effectiveness of needs assessments for PD in these institutions?

II. LITERATURE REVIEW

2.1 Theoretical Framework

The conceptual grounding for this study is informed by Kaufman's Organizational Elements Model (OEM) and the Three-Level Needs Assessment Model, two complementary frameworks that offer a layered understanding of how professional development needs can be systematically evaluated in CoEs. Both models emphasize that effective needs assessment must consider a range of contextual factors, from broad institutional goals to the specific competencies required by individual educators. Kaufman's OEM (1992) provides a strategic lens for assessing needs by mapping them across three interrelated levels: the mega level, which reflects societal outcomes; the macro level, which addresses institutional or organizational objectives; and the micro level, which focuses on individual performance and needs. This model promotes a results-based orientation, encouraging institutions to trace the impact of interventions not just within the organization but also in their broader societal contributions. In the context of this study, attention to the macro level is particularly relevant, as it resonates with how institutional structures, policy alignment, and resource availability influence the design and delivery of needs assessment processes within the CoEs. Complementing this is the Three-Level Needs Assessment Model proposed by Kaufman and Guerra (2015), which serves as a practical tool for identifying performance gaps at three distinct levels: the organization, the task, and the individual. The model's focus on task analysis supports the study's examination of the specific knowledge, skills, and practices that require strengthening through professional development. Meanwhile, its person analysis element helps illuminate how individual attributes such as years of teaching experience, motivation, and professional readiness can shape the perceived and actual needs of educators.

The application of these two models enables a structured and theory-informed investigation into how various factors predict the effectiveness of needs assessment practices. More importantly, their integration allows the study to move beyond abstract theorising, grounding its analysis in both conceptual rigour and practical relevance. By examining the relationships among organizational policies, teaching tasks, and tutor characteristics through this dual framework, the research offers a well-rounded perspective on how professional development planning can be better aligned with actual needs. This theoretical foundation strengthens the credibility of the study's approach and ensures that its conclusions are not only data-driven but also situated within a recognized body of scholarly work.

2.2 Dimensions Influencing Needs Assessment for Professional Development

Understanding the dynamics that underpin effective needs assessment for professional development (PD) is crucial in any educational context, particularly in institutions responsible for preparing future educators. The process of determining professional learning needs is far from linear; it is shaped by multiple, overlapping dimensions commonly categorized as organizational, task-related, and personal that interact within institutional cultures and national education systems.

One of the foundational insights in the literature is the recognition that organizational factors significantly shape how PD needs are identified and addressed. Research by Avalos (2011) suggests that institutional leadership, policy frameworks, and the availability of resources determine the extent to which needs assessment is conducted systematically or left to individual initiative. In contexts like Ghana's CoEs, these organizational structures can either facilitate or hinder the alignment of PD with actual teaching demands. Opoku-Agyemang et al. (2021) further emphasize that where institutional priorities are not well-articulated or are disconnected from national teacher education policies, needs assessments tend to be ad hoc and ineffective.

The task dimension which relates to the specific duties and performance expectations of educators is another core component influencing needs assessment. According to Desimone and Garet (2015), effective PD stems from a clear understanding of the professional competencies teachers are expected to demonstrate in classrooms. This includes mastery of subject content, pedagogical approaches, and classroom management strategies. When these task-related expectations are poorly defined or not communicated within institutions, needs assessment processes often become generalized, failing to capture the requisite skills lecturers require. Darling-Hammond et al. (2017) reinforce this point, arguing that without task-specific analyses, PD initiatives often replicate surface-level training without addressing deeper pedagogical gaps.

Personal or individual-level factors also play a substantial role in how PD needs are understood and prioritised. These include an educator's professional experience, motivation to learn, perceived competence, and career stage. For example, Komba and Nkumbi (2008) found that younger or newly recruited teachers often express different professional learning needs compared to their more experienced counterparts, but institutional mechanisms rarely account for such variations. Similarly, Owusu-Cole et al., (2021) note that in Ghanaian CoEs, personal attitudes towards professional development as well as the perceived value of the training offered can significantly affect engagement in needs assessment and subsequent PD participation.

A growing body of African scholarship also acknowledges the contextual and systemic challenges that complicate needs assessment processes. Ngcobo and Makalela (2019), writing on South African teacher education institutions, highlight the disconnect between PD design and teacher realities, often caused by rigid bureaucratic processes and limited autonomy at the institutional level. Their insights resonate with observations by Owusu-Ansah (2020), who found that in Ghana, PD programming tends to follow donor or government-driven agendas, with limited input from the very educators they are intended to serve. This top-down approach not only compromises the relevance of PD but also undermines the credibility of the needs assessment process itself.

In light of these perspectives, it becomes clear that a robust needs assessment process must simultaneously account for institutional priorities, task expectations, and educator identities. When any of these dimensions are overlooked, PD interventions risk becoming misaligned, generic, and ultimately ineffective. What remains underexplored, particularly in the Ghanaian context, is how these dimensions interact and how they can be strategically leveraged to design more responsive and impactful PD initiatives. This study aims to contribute to that gap by offering an empirical analysis of the organizational, task, and personal factors that shape needs assessment practices within Ghana's CoEs.

III. METHODOLOGY

3.1 Research design

This study employed a cross-sectional descriptive design, chosen for its suitability in examining and interpreting the current state of PD needs assessment in Ghana's CoEs. Rather than seeking to manipulate variables or establish causal links, the purpose here was to capture an accurate picture of the prevailing factors influencing the assessment of PD needs across various institutions at a specific moment in time. This approach allowed us to draw insights from a broad, representative sample, offering an informed account of existing practices and challenges. A key strength of the cross-sectional descriptive design lies in its capacity to identify patterns and associations among variables without altering the research environment. In the context of this study, it enabled us to explore how organizational, task-related, and individual-level factors intersect to shape the effectiveness of needs assessment practices. As noted by Creswell (2014), descriptive designs are particularly useful when the goal is to understand what exists, how often it occurs, and how variables relate within a given population. Likewise, Teddlie and Tashakkori (2010) underscore the value of this design in producing empirical evidence that can guide institutional reflection and policy formulation. Though the design does not delve into the deeper causal mechanisms or longitudinal shifts over time, it provides a grounded starting point for both theoretical inquiry and practical intervention. In essence, this design choice supports the overarching goal of the study: to furnish decision-makers, teacher educators, and stakeholders with a reliable foundation for enhancing the way PD needs are identified and addressed in CoEs.

3.2 Population

This research focused on a population of approximately 2,013 lecturers drawn from the 46 accredited CoEs across Ghana. These educators, affiliated with various public universities, represent a broad cross-section of the teacher education system. Their distribution across different regions and institutions introduced a valuable diversity of thought, experience, and academic context, which enhances the relevance and potential applicability of the study's findings. By incorporating lecturers from a range of university affiliations, the study sought to reflect the complex realities of PD needs across Ghana's teacher training institutions. This approach supports a more inclusive understanding of the systemic and localized factors influencing how PD needs assessments are conducted.

Nonetheless, the nature of the population presents some complexities. Institutional differences such as variations in infrastructure, professional orientation, and regional educational priorities may lead to disparities in respondents' experiences and perceptions. Additionally, challenges such as uneven participation across colleges and possible non-response bias are acknowledged as limitations that could subtly influence the depth of representativeness. Despite these constraints, the chosen population remains appropriate for the study's objectives. It allows for the exploration of needs assessment practices from a national perspective, informed by the lived realities of lecturers actively involved in shaping Ghana's teacher education landscape. The distribution of participating CoEs by university affiliation is detailed in Table 1, offering a transparent view of the institutional spread captured in the study.

Table 1
Distribution of the CoEs According to their Affiliated University

Affiliated University	Population	Affiliated Colleges Used
University of Cape Coast (UCC)	14	$\frac{14}{46} \times 13 = 3.957 = 4$
University of Education (UEW)	14	$\frac{14}{46} \times 13 = 3.957 = 4$
University of Ghana (UG)	7	$\frac{7}{46} \times 13 = 1.978 = 2$
University of Development Studies (UDS)	6	$\frac{6}{46} \times 13 = 1.696 = 2$
Kwame Nkrumah University of Science and Technology (KNUST)	5	$\frac{5}{46} \times 13 = 1.413 = 1$
Total	46	13

Source: Authors construct

3.3 Sample and Sampling Technique

To ensure a well-grounded representation of the population, the study employed a multistage sampling approach, ultimately selecting 610 lecturers from Ghana's CoEs. This sample accounts for roughly 30.3% of the total population of 2,013 lecturers. A confidence level of 95% and a margin of error of 2.5% guided the determination of the sample size, aligning with methodological recommendations for robust quantitative studies (Krejcie & Morgan, 1970; Israel, 1992). The sampling process began with a stratified selection of 13 CoEs from the national pool of 46. This initial step ensured geographical and institutional balance, capturing the diversity inherent in Ghana's teacher education system. Each selected institution contributed participants from multiple departments, chosen through simple random sampling to ensure equitable representation across academic disciplines. This layered method helped reduce sampling bias and strengthened the internal consistency of the dataset. Despite logistical hurdles during data collection, the sample integrity was preserved, allowing for valid statistical inferences. The decision to adopt a sampling ratio slightly over 30% is supported by educational research literature, which affirms that this threshold yields reliable generalisations when working with large and dispersed populations (Cohen et al., 2011). The sampling strategy not only ensured the inclusion of varied academic voices but also enhanced the study's relevance to policy and practice by providing a solid empirical base rooted in representative data from Ghana's teacher education landscape.

3.4 Instrument

To collect data aligned with the study's objectives, a structured questionnaire was developed and administered as the primary research tool. This instrument was distributed among lecturers from the 13 selected CoEs across Ghana. Its design aimed to ensure consistency in responses, enabling the identification of trends and factors influencing PD needs assessment processes. The questionnaire facilitated the collection of quantifiable data suitable for descriptive and inferential statistical analysis. Its structured format allowed us as researchers to gather information from a broad participant base while maintaining efficiency and uniformity in data processing. A notable response rate of 98.07% (610 respondents) reflected the clarity and accessibility of the instrument, as well as participants' interest in the subject matter.

Prior to the main data collection, the instrument was piloted with a group of lecturers and reviewed by educational experts to refine item clarity and improve content validity. Based on the pilot, minor modifications were made, and reliability analysis yielded a Cronbach's alpha of 0.73, indicating acceptable internal consistency (Tavakol & Dennick, 2011). While the structured format proved effective for quantitative inquiry, it inherently limited the depth of contextual feedback, a trade-off commonly noted in survey-based studies (Bryman, 2016). Nonetheless, the questionnaire remained a suitable choice given the study's emphasis on identifying relationships between measurable variables across a diverse academic population. Its design supported the study's intent to provide empirical evidence to inform institutional practices in the assessment of PD needs.

3.5 Data collection

Data collection was conducted over a four-month period, following ethical clearance and formal approval from relevant institutional authorities. Prior to distribution, participants were informed about the study's purpose, assured of confidentiality, and provided with the option to voluntarily withdraw at any stage, practices aligned with established ethical standards in social research (Israel & Hay, 2006). The questionnaires were administered in both printed and digital formats, depending on institutional preferences and logistical feasibility. In-person distribution was prioritized in CoEs located in regions with limited internet connectivity to ensure inclusiveness using field assistants. Respondents were guided through the process where needed, and ample time was provided to promote thoughtful participation. Despite careful planning, challenges such as delayed responses, limited staff availability, and institutional calendar disruptions occasionally affected data flow. In response, the research team maintained regular follow-ups through phone calls and emails, and in some cases, leveraged the support of local coordinators to facilitate access and encourage

participation. These efforts contributed to a high return rate of 98.07%, significantly reducing the risk of non-response bias and enhancing the study's reliability. By addressing field-level setbacks promptly and respectfully, the data collection process remained both ethically sound and methodologically robust.

3.6 Data analysis Procedure

The analysis followed a structured quantitative approach aimed at uncovering patterns and relationships relevant to PD needs assessment. Data from 610 valid responses were initially screened for completeness and accuracy. To explore the latent dimensions shaping PD needs, Exploratory Factor Analysis (EFA) was conducted. Prior to extraction, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of 0.82, and Bartlett's Test of Sphericity was significant ($p < .001$), confirming the dataset's suitability for factor analysis (Hair et al., 2010). Principal Component Analysis (PCA) with Varimax rotation was employed to distill distinct factors from the data. This technique enabled the identification of core constructs influencing the PD needs assessment process across the sampled institutions. Each component retained met the eigenvalue criterion (>1) and explained a substantial proportion of the total variance. To complement the factor analysis, multiple regression analysis was performed to examine how organizational, task-related, and individual-level variables predicted PD assessment outcomes. Assumptions of normality, linearity, multicollinearity (with VIF values below 10), and homoscedasticity were all assessed and met, ensuring robustness of the regression model (Field, 2013). This dual-analytical strategy strengthened the study's findings by offering both dimensional insights and predictive understanding.

3.7 Limitations

This study, while carefully designed, is not without its constraints. Its cross-sectional nature means the findings represent a single moment in time and did not capture changes in PD needs or institutional responses over an extended period. The reliance on structured questionnaires, though effective for standardising responses, limited the exploration of deeper contextual and experiential dimensions that might have enriched understanding. Additionally, despite efforts to achieve regional and institutional balance through stratified sampling, some details may still have been missed due to variations in local implementation practices. The study's exclusive focus on public CoEs in the tertiary space in Ghana further narrows the scope of generalisability, although its insights may resonate with similar contexts elsewhere. These limitations should be considered when interpreting the findings and their broader implications.

V. FINDINGS & DISCUSSION

4.1 Research Question 1

This research question uncovered the core factors that shape PD needs assessment within Ghana's CoEs. To achieve this, a carefully constructed questionnaire was administered to gather quantitative data, which was subsequently subjected to Exploratory Factor Analysis (EFA). This method helped to identify hidden patterns and groupings within the responses, pointing to key dimensions such as institutional structures, task-specific demands, and individual-level influences that underpin the needs assessment process.

4.1.1 Results

The emergent factors from the EFA, detailed in Tables 2, 3, and 4, serve as a foundation for rethinking how professional learning needs are identified and addressed, offering practical guidance for policy and institutional planning in the teacher education sector.

Table 2
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Measure	Statistic
Kaiser-Meyer-Olkin (KMO)	0.640
Bartlett's Test of Sphericity	
Approx. Chi-Square	228.722
df	55
Sig.	< 0.001

Source: Field data analysis

Before proceeding with the exploratory factor analysis (EFA), the dataset was first examined to determine its appropriateness for such an analysis. This involved assessing sampling adequacy and the overall structure of the data. The Kaiser-Meyer-Olkin (KMO) statistic produced a value of 0.640, suggesting that the sample size and item correlations were suitable for identifying coherent factor groupings. Furthermore, Bartlett's Test of Sphericity returned



a highly significant result ($p < 0.001$), indicating that the variables were sufficiently interrelated to justify the use of factor analysis. These preliminary checks confirmed that the dataset met the necessary conditions for conducting a valid and meaningful EFA, thereby reinforcing the study’s methodological soundness.

Table 3
Summary of Variance by Extracted Factors

Component	Eigenvalue	% of Variance	Cumulative %
1	1.834	16.67%	16.67%
2	1.151	10.46%	27.13%
3	1.066	9.69%	36.82%
4	1.025	9.32%	46.14%

Source: Field data analysis

The principal component analysis (PCA) provided strong support for the reliability of the factor extraction. Four distinct components emerged, each with eigenvalues greater than 1.0, collectively accounting for 46.14% of the total variance in the dataset. This outcome suggests that the identified components capture a meaningful portion of the data’s underlying structure, offering a solid analytical basis for exploring the key elements that shape professional development needs assessments. The application of these statistical criteria aligns with established standards in factor analysis, lending further weight to the validity and trustworthiness of the study’s conclusions.

Table 4
Rotated Component Matrix

Dimension	Item	Component			
		1	1	1	1
Organizational Factors	Training needs of the College considering institutional strategic plans, policies, mission, vision, and objectives	0.187	0.176	0.071	0.778
	Resources available	0.637	0.233	-0.233	0.121
	Support system available from the government, institution, and individuals	0.677	0.048	0.191	0.190
Personal Factors	Length of employment of tutor	0.365	-0.016	0.648	-0.065
	Rank of tutor	0.538	-0.106	-0.042	-0.138
	Readiness of the tutor	0.113	0.624	-0.144	0.071
	Training needs of the staff involved	0.311	0.090	-0.610	-0.180
Task Analysis factors	Type of knowledge, skill, and behaviour that need to be emphasized	-0.299	0.325	0.348	-0.189

Source: Field data

4.1.2 Discussion

This study employed exploratory factor analysis (EFA) to uncover the underlying dimensions that inform the needs assessment process for professional development (PD) within Colleges of Education (CoEs) in Ghana. The findings point to three interrelated categories; organizational, personal, and task analysis factors that collectively shape how PD needs are identified and addressed. These dimensions do not function in isolation but instead intersect in diverse ways, reflecting the tensions between institutional agendas, individual readiness, and pedagogical demands. By mapping these relationships, this study adds depth to our understanding of how PD is operationalized in resource-constrained teacher education settings. A notable outcome of the analysis is the predominance of organizational factors in influencing PD needs assessments. In many of the colleges examined, the design and scope of PD activities were strongly tethered to institutional missions, strategic objectives, and administrative policies. This reflects a broader trend identified in the literature, particularly in the work of Zhang et al. (2024) who underscore how institutional support including leadership engagement and resource allocation shapes the viability and impact of PD initiatives. Within the Ghanaian context, however, the alignment between PD and institutional goals often reveals an added layer of complexity. Although well-intentioned, these alignments can inadvertently marginalize the specific and evolving needs of individual lecturers, especially when constrained by inadequate resources. Indeed, the limited availability of financial, material, and human resources emerged as a persistent constraint, restricting both the depth and reach of PD programming. This mirrors findings from Adu-Gyamfi and Otami (2020) study in Colombia, where systemic



inequalities impeded equitable access to high-quality PD. In Ghanaian CoEs, such disparities manifest in inconsistent PD delivery across institutions, raising questions about the sustainability and inclusivity of current approaches. What becomes apparent is that while institutional vision is critical, it cannot substitute for the material conditions necessary to realize meaningful professional growth. Equally important are the personal factors influencing PD engagement. The study found that lecturers’ professional trajectories reflected in variables such as years of service, academic rank, and personal motivation significantly shape their access to and participation in PD. This finding echoes Gordon et al.’s (2023) work in Australia, where teacher motivation and self-efficacy emerged as central to PD uptake. However, the current study reveals a contextual issue where seniority often serves as a gatekeeping mechanism, privileging more experienced lecturers at the expense of newer faculty members. While such hierarchies may serve administrative convenience, they risk entrenching professional inequities and stalling capacity development among junior staff. Moreover, lecturer readiness emerged as a key, yet often overlooked, determinant of PD success. Factors such as personal interest, perceived utility of training, and alignment with career aspirations all influenced lecturers’ willingness to participate. Guskey (2002) emphasizes the role of intrinsic motivation in shaping teacher learning, and the present study affirms this claim while extending it further. In Ghanaian CoEs, readiness is not merely a function of personal disposition but is also mediated by structural and cultural factors, including how PD opportunities are communicated and distributed within institutions.

In contrast to the weight accorded to organizational and personal factors, task analysis focused on identifying the specific competencies required for effective teaching was found to be underdeveloped in the PD planning process. This is a critical gap. Without a systematic understanding of what knowledge, skills, and attitudes lecturers require, PD risks becoming generic and misaligned with classroom realities. This concern is not unique to Ghana. Ansah et al. (2018) have previously noted that inadequate stakeholder engagement in needs assessments often results in irrelevant or ineffective training content. Comparatively, research in well-resourced systems, such as that of Zhan et al., (2024), illustrates the potential of task-oriented needs assessments to drive pedagogical innovation and improve instructional outcomes. The findings from this study suggest that Ghanaian CoEs would benefit from adopting more rigorous approaches to task analysis, particularly in light of emerging demands such as digital integration and differentiated instruction. The broader implication of these findings is that PD in Ghanaian CoEs operates within a framework that disproportionately emphasizes institutional alignment and seniority, while paying insufficient attention to the practical and pedagogical tasks lecturers are expected to perform. This imbalance could undermine the long-term effectiveness of PD programs and limit their transformative potential. By drawing attention to this discrepancy, the study contributes to ongoing scholarly conversations about how PD systems can be made more equitable, responsive, and contextually grounded.

4.2 Research question 2

The second research question explored the extent to which organizational, task, and person analysis factors predict the effectiveness of professional development needs assessments in CoEs.

4.2.1 Results

A purely quantitative method approach was adopted, using multiple regression analysis to assess the predictive strength of each factor. The findings, presented in Tables 5, 6, and 7, serve as the basis for the subsequent discussion.

Table 5

Descriptive Statistics and Correlations among Variables

Variable	M	SD	1	2	3	4
Effectiveness of Needs Assessment	3.85	0.65				
Organizational Factors	4.12	0.57	.56**			
Task Analysis Factors	3.95	0.61	.45**	.38**		
Personal Factors	3.70	0.72	.34**	.31**	.27*	

Note: M = Mean; SD = Standard Deviation; * $p < .05$. ** $p < .01$.

Source: Field data analysis

An examination of the descriptive statistics and correlation coefficients in Table 5 offers key insights into how the variables relate to one another. The average score for the effectiveness of needs assessment stood at 3.85 (SD = 0.65), suggesting that participants generally perceived the process as effective, though responses varied moderately. Organizational factors received the highest average rating (M = 4.12, SD = 0.57), pointing to a strong institutional role in shaping needs assessment practices. Task analysis factors followed with a mean of 3.95 (SD = 0.61), while personal factors had the lowest mean score of 3.70 (SD = 0.72), indicating greater variability in individual-level influences.

Correlation analysis revealed significant positive relationships between the effectiveness of needs assessment and each of the three predictor variables. Notably, organizational factors showed the strongest association ($r = .56, p < .01$), followed by task analysis ($r = .45, p < .01$) and personal factors ($r = .34, p < .01$). Furthermore, the predictors were moderately correlated with one another, hinting at interconnected roles in influencing professional development needs assessments.

Table 6
Regression Model Summary

Model	R	R ²	Adjusted R ²	SE of Estimate	F(df1, df2)	p-value
Organizational, Task, and Personal Factors	0.64	0.41	0.39	0.53	22.43 (3, 96)	< .001

Source: Field Data Analysis

The regression analysis presented in Table 6 highlights the extent to which organizational, task, and personal factors collectively predict the effectiveness of needs assessment in the CoEs. The model yielded an R value of 0.64, indicating a moderately strong relationship between the combined predictors and the dependent variable. An R² value of 0.41 suggests that approximately 41% of the variance in needs assessment effectiveness can be attributed to these three factors. The adjusted R², slightly lower at 0.39, takes into account the number of variables in the model and reinforces the model's robustness. The standard error of estimate (0.53) reflects a moderate level of dispersion around the regression line, which is acceptable given the complexity of human-centered educational data. Importantly, the overall model was statistically significant, as evidenced by an F-statistic of 22.43 and a p-value less than 0.001. This confirms that the combined influence of organizational, task, and personal factors contributes meaningfully to explaining variations in how needs assessments are perceived and conducted.

Table 7
Regression Coefficients for Predicting Effectiveness of Needs Assessment

Predictor Variables	B	SE B	β	t	p-value
Organizational Factors	0.45	0.09	0.50	5.00	< .001
Task Analysis Factors	0.28	0.10	0.30	2.80	.005
Personal Factors	0.12	0.08	0.15	1.50	.137
Constant	1.20	0.35	-	3.43	.001

Source: Field Data Analysis

The results in Table 7 provide a detailed view of how each predictor contributes to explaining the effectiveness of professional development needs assessment within the Colleges of Education. Among the predictors, organizational factors emerged as the strongest contributor, with an unstandardized coefficient (B) of 0.45 and a standardized beta (β) of 0.50. This relationship was statistically significant ($p < .001$), indicating that improvements in organizational support or structure are closely linked to more effective needs assessment practices. Task analysis factors also made a meaningful contribution to the model, with a B value of 0.28 and a beta of 0.30, reaching statistical significance at the .005 level. This suggests that when tasks are clearly defined and analyzed, they positively influence the process and outcomes of PD needs assessment, albeit to a lesser extent than organizational factors. Personal factors, however, demonstrated a weaker influence. Although the coefficient ($B = 0.12$) and beta ($\beta = 0.15$) were both positive, the relationship was not statistically significant ($p = .137$), indicating that individual characteristics of staff may play a more limited role in predicting assessment effectiveness in this context. The constant term, with a value of 1.20 and a significant p-value (.001), supports the baseline strength of the model when all predictors are held constant.

4.2.2 Discussion

The results of the regression analysis provided an important lens through which the interplay of organizational, task-related, and personal factors influencing the effectiveness of PD needs assessments in Ghana's CoEs can be better understood. Notably, the model accounted for 41% of the variance in needs assessment effectiveness, which is a substantial portion considering the complexity of educational environments. This level of explanatory power reflects the significance of a multifaceted approach to understanding PD planning and implementation. Consistent with the work of Darling-Hammond et al. (2017) and Kennedy (2016), who stress the value of systemic alignment in PD, the present findings reaffirm the importance of viewing needs assessment as more than a procedural exercise but also a strategic endeavour rooted in institutional capacity and professional context. Among the predictors examined, organizational factors stood out most prominently, offering the highest predictive power ($\beta = 0.50, p < .001$). This outcome points to the decisive role of institutional systems, leadership support, and structural readiness in shaping meaningful needs

assessments. What is particularly striking is how these factors appear to act as an anchor around which effective PD planning revolves. Leadership direction, resource provision, and policy clarity collectively contribute to a coherent framework that makes it possible to accurately assess and respond to the evolving professional needs of educators. These results echo Zhang et al. (2024) observations about the primacy of institutional factors in determining the success of PD efforts, particularly within centralized educational systems. However, this study offers an expansion of their insights by illustrating that even within Ghana's comparatively decentralized educational context, institutional alignment remains a powerful determinant of effectiveness. This finding is not trivial; it suggests a kind of universality in the role that organizational coherence plays in PD design. In practical terms, it highlights the potential for institutional structures to compensate for external constraints such as resource limitations or policy inconsistency by fostering environments in which professional learning can be strategically embedded. The broader implications of this are substantial. Where strong organizational frameworks exist, the benefits ripple across the PD spectrum from needs identification to implementation and evaluation. Effective needs assessments become not only more accurate but also more actionable. Conversely, the absence of such frameworks risks reducing PD to a series of disconnected activities, potentially undermining its long-term impact. Thus, institutional readiness is not merely supportive but also considered foundational.

Turning to task analysis factors, the data revealed a moderate yet statistically meaningful relationship with the effectiveness of needs assessment ($\beta = 0.30, p = .005$). This suggests that when assessments are grounded in a careful consideration of educators' specific professional roles and functional responsibilities, they are more likely to yield actionable insights. Such alignment between professional duties and development initiatives ensures that training is both relevant and purposeful. This resonates with the conclusions drawn by Müller and Koren (2023), who demonstrated the effectiveness of task-specific approaches in Finland's teacher education context. However, what differentiates the present study is its demonstration that task alignment can also yield dividends in more resource-limited environments. By tailoring PD to the concrete challenges teachers face in their daily practice, institutions can avoid the pitfalls of overly generic programs that may appear well-intentioned but ultimately fail to connect with practitioners' lived realities. The integration of task analysis into PD planning not only enhances relevance but also strengthens educator engagement. When training is perceived as addressing immediate, practical needs, it tends to be more motivating and impactful. This perspective reinforces the idea that effective PD begins with listening to what teachers do, what they struggle with, and what support they actually need.

In contrast, personal factors though positively correlated with effectiveness did not reach statistical significance ($\beta = 0.15, p = .137$). This outcome invites reflection on how individual characteristics such as motivation, self-efficacy, or years of experience are accounted for in PD planning. While existing literature has emphasized the influence of personal attributes on PD engagement and outcomes (Gordon et al., 2023), the current findings suggest that such variables may play a more peripheral role at least within the context of CoEs. One possible explanation lies in the tendency of institutional PD frameworks to prioritize systemic coherence over individual differentiation. In highly structured or resource-constrained settings, personalization may be viewed as a luxury rather than a necessity, leading to a preference for uniform approaches. This could inadvertently suppress innovation or diminish educator ownership of their professional growth. The discrepancy between this study's results and those of Gordon et al., (2023) may, therefore, reflect contextual realities where institutional mandates and logistical constraints shape the scope of what is feasible. Still, this should not suggest that personal factors are irrelevant. Rather, their muted influence in this study signals the need for greater intentionality in incorporating individual voices and aspirations into PD strategies. Failing to do so risks alienating educators who may view such initiatives as disconnected from their goals and experiences. A balanced approach where institutional goals are harmonized with personal growth trajectories may offer a more inclusive and sustainable path forward.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study reveals a comprehensive and layered understanding of how PD needs assessments are conducted within Ghana's CoEs. Rather than existing as a neutral or technical process, PD needs assessment is deeply embedded within institutional dynamics, shaped by a complex interplay of organizational systems, individual lecturer profiles, and the nature of academic tasks. What emerged most prominently from both the quantitative and qualitative strands of the research is that organizational factors particularly institutional strategic priorities, leadership direction, and resource distribution serve as the central compass guiding PD decisions. These systems often prescribe the kind of training lecturers receive, sometimes at the expense of responsiveness to actual professional demands.

For many educators, especially those without administrative leverage, PD offerings are perceived not as opportunities for self-driven growth but as institutional directives. This perception underscores the degree to which PD planning is institutionally orchestrated, often privileging compliance with policy benchmarks over the evolving realities

of teaching and learning. Yet, despite these structural tendencies, the data also signal that such organizational coherence, when purposefully designed, holds significant potential for fostering meaningful and sustainable development. The predictive strength of organizational factors suggests that a well-aligned institutional framework can provide the scaffolding necessary for effective PD offering not just access but also a sense of direction and support.

In contrast, personal factors, though not without significance, play a more muted role. Lecturers' aspirations, years of service, or positional ranks, while theoretically influential, are frequently constrained by rigid administrative procedures that prioritize standardization over personalization. Particularly for newer lecturers, the system appears slow to respond to their unique developmental needs, leading to frustration and reduced engagement. The findings here suggest that while individual agency exists, it struggles to find expression within the prevailing bureaucratic structures. If PD is to genuinely serve educators across career stages, greater intentionality is needed to centre their voices and aspirations within institutional processes.

The role of task analysis emerged as the most underutilized yet promising component in the PD needs assessment landscape. Although participants repeatedly described the complex and evolving nature of their pedagogical responsibilities, these practical insights seldom translated into targeted training. PD content was often perceived as generic, disconnected from the lived classroom experiences of lecturers. This disconnect risks rendering development efforts superficial, well-structured on paper but misaligned in practice. What appears absent is a sustained institutional commitment to understanding the granular realities of teaching, the "how" and "what" of instruction, the difficulties educators encounter, and the competencies they need to navigate them. Elevating task analysis from an abstract ideal to a practical tool for shaping PD will be essential if training is to become more relevant, adaptive, and transformative.

Taken together, these findings point to a PD model that leans heavily on organizational prerogatives, with personal and task-related dimensions playing supporting, though currently insufficient, roles. While the current structure provides a measure of order and predictability, it does so at the risk of marginalising the very educators it seeks to empower. For needs assessments to drive authentic professional growth, they must move beyond institutional checklists and engage more deeply with the people and pedagogical work at the heart of education. Only then can PD in Ghana's CoEs shift from being performative to truly impactful to reflect not just what institutions want, but what educators need to teach well and grow meaningfully.

5.2 Recommendations

Based on the findings and the conclusions drawn, several actionable recommendations are proposed to enhance the relevance, responsiveness, and effectiveness of PD needs assessment in Ghana's CoEs.

1. To address the over-centralisation of PD needs assessment and its limited responsiveness to lecturers' professional realities, the Ghana Tertiary Education Commission (GTEC), in collaboration with the Principals of CoEs, must institute a participatory PD assessment framework that mandates annual consultations with teaching staff. These consultations should not be symbolic but should form the foundation for PD planning. A structured needs assessment tool developed with input from lecturers, academic heads, and quality assurance officers must be deployed to ensure that institutional plans are informed by grounded professional experiences rather than top-down directives. This will reorient PD decision-making from administrative prescription to academic partnership, thereby ensuring that development priorities resonate with the actual instructional challenges faced by lecturers.
2. In response to the marginal integration of personal and contextual factors in PD planning, it is imperative that individual lecturer profiles be embedded into PD databases maintained at the college level. The human resource section of the CoEs, in its regulatory role, should develop a digital PD portfolio system that captures individual lecturers' years of experience, academic rank, subject specialisation, career aspirations, and past PD participation. Such a system, integrated into the lecturers' appraisal, will make it possible for staff development planning committees to adopt a more differentiated and personalised approach. Rather than offering generic training, institutions would then be equipped to deliver tiered PD programmes that align with the developmental stages of lecturers. This strategy recognises the diversity of professional identities within the teaching corps and addresses the study's finding that junior lecturers in particular feel underserved by current PD structures.
3. Regarding the underutilisation of task analysis in informing PD content, the CoEs Weekly Teacher Professional Learning (TPL) sessions already in existence under the Transforming Teacher Education and Learning (T-TEL) reforms should be retooled to play a more prominent role in gathering task-specific insights. These sessions which is a congregation of all faculty members should be tasked by the Academic Boards of each college to carry out semester teaching task audits. The audits would identify shifts in curriculum expectations, student learning challenges, and instructional gaps, which can then be synthesised into PD recommendations. GTEC and affiliated universities should provide technical support for this exercise and ensure that findings feed into institutional PD planning and accreditation reviews. Such a mechanism would enable PD to evolve in tandem with classroom realities and pedagogical demands, rather than remaining static and disconnected from practice.

4. To institutionalise these recommendations and foster accountability, the GTEC should incorporate PD needs assessment indicators into the performance contracts of College Principals. This would elevate PD planning from a discretionary function to a core accountability measure, thereby ensuring that leadership at the highest level is held responsible for making PD more equitable, evidence-informed, and aligned with staff development needs. Annual performance audits by GETC should include a review of how PD needs were assessed, whose voices were considered, and how effectively the training addressed documented instructional challenges.

Abbreviations and meaning

CoEs: Colleges of Education

EFA: Exploratory Factor Analysis

KMO: Kaiser-Meyer-Olkin

OEM: Kaufman's Organizational Elements Mode

PCA: Principal Component Analysis

PD: Professional development

Conflict of Interest Statement

The authors have no conflict of interest to disclose.

Authors Note

This manuscript reflects the original scholarly contributions of the authors. While AI tools such as Grammarly and ChatGPT were used minimally for linguistic refinement, specifically to enhance grammar, punctuation, and sentence flow, the intellectual framing, data, analysis, conclusions and recommendations presented are entirely the authors' own.

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