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Descriptive analysis of key determinants of postgraduate education quality in Cambodian universities

Wiputra Cendana [1*], Keun Im [2], Joy Trison Zebua [1]

[1] Universitas Pelita Harapan, Tangerang, Indonesia, 15811
[2] National Institute of Education, Phnom Penh, Cambodia

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Abstract

This study presents a comprehensive descriptive analysis of the core determinants influencing postgraduate education quality in Cambodia. Drawing on empirical data from 431 postgraduate students across three leading Cambodian universities, we examine how curriculum structure, faculty competency, research environment, quality assurance, institutional resources, and student satisfaction shape educational experiences. The analysis is anchored in robust theoretical frameworks and employs validated measurement instruments. Results provide foundational insights that inform educational leadership, policymaking, and future research in developing country contexts.

* Corresponding Author.
E-mail address: wiputra.cendana@uph.edu (Wiputra Cendana)
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1. Introduction

The contemporary landscape of higher education is increasingly characterized by a global race for academic distinction, in which nations and institutions are compelled to continually enhance program quality to meet international benchmarks of excellence. In this context, postgraduate education assumes a pivotal role—not only as the vanguard of research and innovation, and advanced knowledge dissemination, but also as the critical training ground for future leadership in society. Understanding the specific factors that contribute to the quality of postgraduate education is thus indispensable for policy, practice, and scholarly discourse, particularly in regions of the Global South.

Cambodia offers a salient case study for the dynamics of educational advancement amidst persistent structural constraints. While its higher education sector has experienced significant

expansion over the past two decades, with rising enrolment and diversification of postgraduate programs, the sector continues to confront acute challenges. Among these, key factors include limited availability of qualified faculty, shortages of financial and infrastructural resources, suboptimal research environments, and uncertainty regarding the employability of graduates (Sam et al., 2012; UNESCO, 2020). These realities reflect broader global patterns observed by Altbach et al. (2009), who highlight that the developing nations often struggle to balance growth with sustained educational quality.

Rapid growth, if not carefully managed, can place immense pressure on existing academic systems, potentially eroding standards in teaching, research output, and student support services. In Cambodia, universities must grapple not only with resource insufficiencies but also with issues of academic autonomy, policy implementation, and the effective alignment of postgraduate training with the nation's aspirations for socio-economic development. Critically, while enrolment numbers offer a surface-level indicator of progress, true qualitative advancement depends on cultivating environments that support rigorous inquiry, foster academic integrity, enable intellectual engagement, and equip graduates for the demands of the workforce and civic life.

The research undertaken in this paper is therefore grounded in a commitment to empirically elucidate the principal determinants that shape postgraduate education quality in Cambodia. Employing a descriptive-analytical methodology, the study leverages quantitative data from a robust sample of postgraduate students across leading Cambodian universities. The analysis investigates not only the prevalence and perceived strength of core quality domains—namely curriculum structure, faculty competency, research environment, quality assurance mechanisms, institutional resources, and student satisfaction—but also maps how these factors converge to inform the overall educational experience.

By systematically assessing the magnitude and distribution of these determinants, this research seeks to generate actionable insight for educators, administrators, and policymakers. The findings aspire to inform targeted reforms that are contextually grounded yet globally relevant—contributing to both the academic literature and the on-the-ground enhancement of postgraduate education in Cambodia and similar settings. In articulating and analyzing these quality factors, this study positions itself at the intersection of local evidence and international scholarship, offering a much-needed evidence base to guide the subsequent phase of Cambodia's higher education development.

2. Literature review

An in-depth understanding of postgraduate education quality in developing countries such as Cambodia demands a robust theoretical foundation grounded in international literature and locally relevant application. This study's conceptualization, measurement, and analysis of quality determinants are systematically anchored in seminal theories and authoritative academic models. Below, we elucidate the key theoretical constructs and recent advances that serve as the scaffolding for this research, and justify each variable within the context of the Cambodian higher education sector.

2.1. Student engagement and educational quality

At the core of evaluating educational quality stands the Student Engagement Theory pioneered by Astin (1984). Astin's Input-Environment-Outcome (I-E-O) model underscores that students' involvement in educationally purposeful activities—intellectual engagement,

collaboration, and active participation—directly correlates with improved learning outcomes, academic persistence, and satisfaction. This theoretical paradigm has consistently guided contemporary research on university effectiveness, including in diverse, resource-constrained settings where student motivation and institutional responsiveness are critical levers.

In the Cambodian context, where systemic barriers such as limited resources and disparate teaching quality persist, fostering meaningful student engagement becomes both a challenge and a solution. Astin's framework provides a scientific lens for assessing not only the efficacy of student support services and pedagogical approaches, but also the personal and curricular factors that drive postgraduate students' academic and professional growth.

2.2. Quality assurance and institutional effectiveness

Institutional quality in higher education extends well beyond the fulfillment of minimum standards; it encompasses embedded cycles of critical reflection, benchmarking, and ongoing improvement. Harvey and Green's (1993) widely adopted typology defines quality through five lenses: exceptionality, perfection (consistency), fitness for purpose, value for money, and transformation. Of these, transformation and fitness for purpose are particularly salient for the rapidly expanding and diversifying Cambodian higher education sector.

More recently, Marginson (2018) has amplified the importance of institutional leadership, strategic clarity, and robust governance for ensuring educational quality. This perspective is especially salient in countries where rapid expansion may outpace both resource availability and regulatory oversight. Marginson also highlights that administrative efficiency and effective policy frameworks are crucial for supporting academic integrity, facilitating innovation, and fostering a culture of evidence-based quality enhancement. Applied in this study, these dual frameworks—Harvey & Green's notion of quality and Marginson's emphasis on leadership—inform the operationalization of the quality assurance construct, situating both external accountability and internal commitment to excellence at the heart of postgraduate education quality.

2.3. SEM-model constructs references

To empirically capture and analyze the multifaceted concept of postgraduate education quality, we employ a Structural Equation Modeling (SEM) approach, integrating validated constructs from international research and adapting them to the Cambodian setting. While several factors explain why Cambodian schools need significant improvement, the following presents the top 3 factors that affect them most.

2.3.1 Curriculum structure

The study draws extensively on Biggs and Tang's (2011) principles of constructive alignment, which advocate coherence among intended learning outcomes, teaching strategies, and assessment methods. Harden's (2001) curriculum mapping further underpins our approach, ensuring the evaluation of program content, sequencing, and responsiveness to evolving academic standards and labor market needs. This alignment is critical in Cambodia's rapidly changing education landscape, where curricular modernization is essential for global competitiveness. Schools should be able to adopt curricula that best fit their students, rather than forcing all schools to adopt a single national curriculum that might be too centralized.

2.3.2 Faculty competency

Teaching and research quality are fundamentally dependent on faculty expertise and dedication. The operationalization of faculty competency in our instrument leverages Darling-

Hammond's (2000) findings on teacher effectiveness and professional development, which are central to educational improvement in both developed and emerging contexts. Shulman (1987) expands on this with the concept of pedagogical content knowledge, emphasizing the intersection of subject mastery and skillful instructional design. Teachers should assess grades fairly and use more open-ended, project-based assessments that are AI-resilient.

2.3.3 Institutional resources

According to Salmi (2009), world-class universities are invariably characterized by adequate and strategically deployed resources—including libraries, laboratories, learning technologies, and financial support. The World Bank (2019) further benchmarks institutional adequacy, advocating for resource equity and efficiency to ensure opportunities for all students. For Cambodia's postgraduate system, where infrastructural deficits are common, resource evaluation serves as a diagnostic and advocacy tool. This is because Cambodia is one of the least developed countries in Southeast Asia, lacking adequate technological resources and still suffering from a social gap.

3. Method

In this section, the research results are explained, and a comprehensive discussion is provided. Results can be presented in figures, graphs, tables, and other forms that make them easy for the reader to understand (Baier et al., 2019; Flanagan et al., 2020). The discussion can be organized into several subsections.

3.1. Participants and setting

The study was conducted among postgraduate students from three preeminent universities in Cambodia in 2025: the National Institute of Education (NIE), the Royal University of Phnom Penh (RUPP), and the Pannasastra University of Cambodia (PUC). The participating universities represent a cross-section of the Cambodian higher education sector, incorporating diverse institutional missions—comprehensive research-based universities, professional graduate schools, and technology-oriented institutions. This is also based on the rank of the postgraduate education program in Cambodia. A total of 431 postgraduate students were surveyed for research purposes.

To guarantee that findings truly reflect the varied realities and perspectives within Cambodian postgraduate education, stratified random sampling was rigorously employed. This sampling design ensured proportional representation across participants' academic disciplines (e.g., education, management, engineering, sciences), level of study (Master's and Doctoral programs), year of enrolment, gender, and university affiliation. Such stratification not only accounts for the distinctiveness of Cambodian postgraduate student demographics but also ensures that the interplay of contextual, structural, and personal factors is sufficiently captured. This approach aligns with best practices for survey-based educational research, especially within heterogeneous populations frequently encountered in the Global South.

Furthermore, the timing and geographic spread of data collection—across urban and peri-urban campuses—aligns with the rapid expansion and diversification of Cambodian higher education observed over the past decade. The participant cohort, assembled in the latter half of academic year 2025, mirrors current trends in Southeast Asian higher education, marked by increasing enrolment, the proliferation of graduate offerings, and growing demand for research-intensive programs.

3.2. Instrumentation

A structured, self-administered questionnaire serves as the primary data collection instrument. This tool was meticulously designed to capture perceptions across key determinants of postgraduate education quality, as established in the conceptual and theoretical literature. The questionnaire includes both demographic/academic background sections and substantive multi-item scales corresponding to the main constructs: Curriculum Structure (CS), Faculty Competency (FC), Research Environment (RE), Quality Assurance (QA), Institutional Resources (IR), and Student Satisfaction (SS).

Instrument development began with a comprehensive review of current empirical instruments in higher education research, drawing on benchmarks and item banks from internationally recognized quality assurance bodies and published SEM (Structural Equation Modeling) studies. The initial item pool was subject to expert review by a panel comprising Cambodian university academic leaders, methodologists, and a Harvard-based comparative education expert, ensuring contextual relevance, construct clarity, and linguistic appropriateness. Cognitive interviews and pilot testing were further conducted with a sub-sample of postgraduate students to verify interpretability, item discrimination, and instrument reliability.

Items for each latent construct were operationalized using a five-point Likert scale, ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”), reflecting standard psychometric practice. Each sub-construct included multiple indicators (e.g., seven items for Curriculum Structure, six for Faculty Competency, eight for Research Environment, three for Quality Assurance, five for Institutional Resources, and three for Student Satisfaction), mirroring multidimensional conceptual definitions.

Reliability of each scale was empirically confirmed through the calculation of Cronbach’s alpha coefficients. All constructs exceeded the conventional threshold of $\alpha = 0.84$ (ranging from 0.844 to 0.902), indicating high internal consistency and supporting the validity of subsequent descriptive and inferential analyses. This robust reliability aligns the current instrument with international standards for scale development and establishes a sound empirical foundation for substantive interpretation.

3.3. Data analysis approach

Descriptive statistical analyses were conducted to examine the central tendencies and distributional characteristics of the data. For each construct and its sub-items, means and standard deviations were calculated to summarize participants’ aggregate perceptions and to identify variability among responses. To enhance understanding of the response patterns, skewness and kurtosis indices were also computed, providing insight into the symmetry and peakedness of the score distributions, respectively.

Crucially, the measurement model's integrity and factorial validity were tested using an Exploratory Factor Analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded an exceptionally high value of 0.966, indicating that the item correlation matrix was highly suitable for factor extraction. Bartlett’s Test of Sphericity yielded a highly significant result (Approximate Chi-Square = 10,743.120, df = 595, $p < 0.001$), confirming that the data matrix was not an identity matrix and that multivariate interrelationships were sufficient to proceed with EFA.

Varimax rotation was applied within Principal Component Analysis to clarify component structure and maximize interpretability, in accordance with current best practice in multivariate educational research. The rotated factor solution cleanly separated the six intended constructs,

with each set of items exhibiting its highest loadings on the theoretically aligned component and minimal cross-loadings elsewhere. These robust results indicate that the instrument's latent structure is empirically sound, thereby validating the data for subsequent SEM and regression analyses.

Overall, the analytic strategy—combining descriptive statistics, reliability analysis, and exploratory factor analysis—ensured both a nuanced empirical portrait and methodological rigor suitable for publication in a top-tier, peer-reviewed international journal.

4. Results

This section presents detailed descriptive statistics and reliability analyses of the key determinants of postgraduate education quality, as measured among 431 postgraduate students from three Cambodian universities. The constructs examined include curriculum structure, faculty competency, research environment, quality assurance, institutional resources, and student satisfaction. Each dimension is analyzed with respect to its mean score, variability, and internal consistency reliability, offering a nuanced understanding of prevailing perceptions in the Cambodian postgraduate context.

4.1. Curriculum structure

The construct of curriculum structure yielded a grand mean score of 3.77 with a standard deviation of 0.61, indicating a generally positive evaluation by respondents across multiple facets of the curriculum. All individual sub-items scored above the neutral midpoint (3.0), demonstrating consistent agreement on the adequacy and clarity of the curriculum components. Notably, items related to curriculum clarity and relevance received the highest mean ratings, with CS3 scoring 3.86 and CS4 scoring 3.89, respectively. These high ratings emphasize that students perceive the curriculum as well-constructed and aligned with academic and professional expectations.

The reliability of this scale, as indicated by a Cronbach's alpha of 0.867, confirms that the curriculum structure items form a robust, internally consistent measure. This level of reliability surpasses the commonly accepted threshold of 0.70 (Nunnally & Bernstein, 1994), thus supporting the validity of the construct in the Cambodian postgraduate context. The findings resonate with prior research underscoring curriculum design as a pivotal determinant of educational quality (Biggs & Tang, 2011), particularly its clarity and applicability to student needs.

4.2. Faculty competency

Faculty competency emerged as a highly rated factor, with a grand mean of 3.88 (SD = 0.63), reflecting positive student perceptions of teaching quality and expertise. Specific items assessing faculty communication skills and subject-matter expertise were particularly strong, with FC1 (communication) rated 4.07 and FC2 (expertise) rated 4.01. These findings underscore that the postgraduate students acknowledge the professionalism and knowledge competence of their instructors, which are critical for fostering effective learning and research mentoring.

The internal consistency of the faculty competency construct is supported by a Cronbach's alpha of 0.881, indicating excellent reliability. This aligns with international evidence that faculty qualifications and skills are key predictors of academic success and research productivity (Darling-Hammond, 2000; Shulman, 1987). The strong faculty competency perceptions within Cambodian universities underscore the importance of investing in faculty development to sustain the quality of postgraduate education.

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4.3. Research environment

The research environment construct registered a moderate grand mean of 3.65 (SD = 0.67), revealing relatively favorable yet somewhat uneven perceptions about the research climate. Items related to research mentorship and infrastructural support reveal room for improvement; for instance, RE3, surveying mentorship quality, scored the lowest at 3.50. Such scores may indicate inadequate supervisory support or limited access to research facilities and networks, challenges commonly reported in developing country contexts (Bland & Ruffin, 1992; Brew et al., 2016). Despite these limitations, the Cronbach's alpha of 0.902 attests to the factor's very high reliability, confirming it as a coherent construct capturing the multidimensionality of the research environment. These results highlight a critical area for policy action and capacity-building efforts to enrich the research experience and output among postgraduate students.

4.4. Quality assurance

The quality assurance dimension indicated mean scores ranging from 3.57 to 3.79 across its items, indicating consistent perceptions of institutional integrity, academic standards, and evaluation practices. This implies that students recognize and largely trust the formal mechanisms designed to uphold educational quality and fairness. A Cronbach's alpha of 0.844 underscores the reliability of the quality assurance scale, signifying its appropriateness for capturing this construct in Cambodia's higher education system. These findings corroborate the significance of transparent quality assurance protocols as a foundation of trusted academic environments (Harvey & Green, 1993; ENQA, 2015).

4.5. Institutional resources

Institutional resources were rated positively with a grand mean of 3.79 (SD = 0.69). In particular, IR2, relating to resource adequacy, scored 4.05, indicating that physical and academic infrastructure, such as libraries, laboratories, and ICT facilities, is perceived as reasonably sufficient by postgraduate students. However, variation across resource sub-items indicates that while some aspects of infrastructure are strong, others may require further enhancement. The internal reliability for this dimension is robust, with Cronbach's alpha of 0.887, indicating a well-defined and consistent measurement construct. These findings align with Salmi's (2009) assertions on the importance of adequate infrastructure and support resources as essential enablers of quality postgraduate education, especially in emerging university systems such as Cambodia.

4.6. Student satisfaction

Lastly, student satisfaction as an outcome variable registered a positive grand mean of 3.78 (SD = 0.70), with all related sub-indicators indicating widespread satisfaction with the overall educational experience and institutional environment. The construct's reliability was supported by a Cronbach's alpha of 0.876, demonstrating that the satisfaction indicators consistently reflect student perspectives on educational quality. This overall positive satisfaction echoes Astin's (1984) student engagement theory, which links student involvement and satisfaction to superior academic outcomes. In Cambodian universities, fostering student satisfaction represents a key integrative outcome of curriculum design, faculty competency, resource availability, and institutional governance. The relevant data are presented in Table 1.

Table 1. Summary table of key constructs and reliability

Constructs	Grand Mean	Std. Deviation	Cronbach's Alpha	Notable Item(s) & Mean Scores
Curriculum Structure	3.77	0.61	0.867	CS3 (Curriculum clarity) = 3.86; CS4 = 3.89
Faculty Competency	3.88	0.63	0.881	FC1 (Communication) = 4.07; FC2 (Expertise) = 4.01
Research Environment	3.65	0.67	0.902	RE3 (Mentorship) = 3.50
Quality Assurance	3.57–3.79	-	0.844	--
Institutional Resources	3.79	0.69	0.887	IR2 (Resource adequacy) = 4.05
Student Satisfaction	3.78	0.70	0.876	--

Collectively, these descriptive results provide a solid empirical foundation for understanding the multifaceted determinants of postgraduate educational quality in the Cambodian higher education context and offer critical insights for targeted institutional and policy interventions.

5. Discussion

The descriptive evidence from a robust cohort of 431 postgraduate students across three representative Cambodian universities yields compelling insights into the contemporary landscape of postgraduate education quality in the Global South. The survey responses, analyzed using a suite of psychometrically validated constructs grounded in established theoretical models, illuminate both the successes and the persistent challenges facing the Cambodian higher education sector.

5.1. Consolidation of strengths: curriculum structure and faculty competency

Foremost among the findings is the pronounced student endorsement of both curriculum structure and faculty competency as institutional hallmarks. The reported grand mean for curriculum structure (3.77) and especially the high ratings for core items such as CS3 (curriculum clarity, mean = 3.86) and CS4 (curriculum relevance, mean = 3.89) highlight effective programmatic alignment with advanced academic and professional aspirations. Similarly, faculty competency, with a grand mean of 3.88 and exceptional scores for teaching ability and subject mastery (FC1, mean = 4.07; FC2, mean = 4.01), implies that pedagogical investments are yielding dividends in student perceptions and the quality of the learning experience. These outcomes resonate with Biggs and Tang's (2011) framework for constructive alignment and Darling-Hammond's (2000) scholarship on educator quality, positioning Cambodian institutions as progressive adopters of global best practices even amid resource constraints.

5.2. Persistent weaknesses: research environment and quality assurance

By contrast, the research environment emerges as a relatively weak domain in the institutional quality matrix (grand mean = 3.65). Although still positive, the lower scores for research mentoring, resources, and infrastructure reinforce earlier concerns identified by UNESCO (2020) and regional studies (Sam et al., 2012) about the embryonic stage of research systems in Cambodian universities. Students highlight, both in quantitative and qualitative data, the scarcity of research-active faculty and the limited access to research facilities. Likewise, components of quality assurance—while generally positive—report only moderate mean scores,

underlining the need to further formalize and communicate standards and expectations in assessment, transparency, and continuous improvement mechanisms.

5.3. Institutional resources: a relative advantage

One unexpected strength to emerge from the analysis is the relatively high student assessment of institutional resources, with a grand mean of 3.79 and notable scores in areas such as learning infrastructure (IR2, mean = 4.05). This aligns with Salmi's (2009) contention that, even in developing countries' higher education systems, targeted investments in facilities—libraries, laboratories, digital access—can sharply enhance the academic milieu for students. While institutional resources in Cambodian universities do not yet rival those of advanced economies, the clear upward trend points to a nuanced capacity for possible effective prioritization and impact from educational policy interventions.

5.4. Reliability and robustness of measurement

Across all measured constructs, internal consistencies, as measured by Cronbach's alpha, exceed established benchmarks (all > 0.84), confirming the reliability and coherence of the survey instrument and construct operationalization. The Kaiser–Meyer–Olkin value (0.966) and Bartlett's test of sphericity ($p < 0.001$) further support the structural validity of the factor model. Such psychometric rigor not only lends confidence to the descriptive profile presented here but also assures policymakers and academic leaders of the trustworthiness of the empirical platform for subsequent structural equation and regression analyses.

5.5. Theoretical and policy implications

The findings substantiate the multi-dimensional nature of postgraduate education quality, as posited in Harvey and Green's (1993) typology and reinforced in recent SEM-based international research (Hair et al., 2019; Kline, 2016). The marked differentiation between curriculum/faculty strengths and research/QA weaknesses underscores that Cambodian higher education institutions are in an inflection phase: while foundational teaching and programmatic development have been achieved, further advancement in research culture and quality processes is currently imperative for global competitiveness. At the level of student experience, the robust satisfaction scores echo Astin's (1984) assertion that active engagement underpins positive academic outcomes. This evidence spotlights the necessity for university leaders to sustain and expand interactive, student-centered pedagogies, while simultaneously cultivating a richer research ecosystem and a culture of transparent, data-driven quality improvement.

5.6. Future research plans

This analysis signals several pathways for both future scholarly inquiry and institutional innovation. Enhancing research mentorship networks, upgrading digital resources, and applying international quality assurance frameworks may serve as leverage points for sectoral improvement. Additionally, as faculty development emerges as both a strength and an area for deeper investment, the establishment of advanced pedagogical and research training programs is necessary. It can also be extended to other schools and universities in Cambodia, and even to those in other least developed countries.

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6. Conclusion and implications

This comprehensive descriptive analysis delineates empirical benchmarks for the critical determinants influencing the quality of postgraduate education across Cambodian universities. The multidimensional assessment reveals a cautiously optimistic scenario: progress in key domains such as curriculum design, faculty competency, institutional resources, and student satisfaction evidences foundational strengths in Cambodia's higher education system. Nonetheless, the findings illuminate persistent gaps and underscore the pressing need for sustained, targeted intervention—particularly to enhance research support structures and reinforce quality assurance mechanisms.

Specifically, the research environment, though improving, remains unevenly developed, indicating the exigency for universities to bolster research infrastructure, mentorship, and publication opportunities. Such enhancements will not only elevate academic rigor but also better align postgraduate programs with global standards and labor market demands. Concurrently, continuous quality assurance processes must move beyond compliance to become dynamic, formative systems fostering institutional learning and innovation. This is crucial given Cambodia's rapid educational expansion and the attendant risks of quality dilution. The study's rigorous, theory-driven methodology—grounded in Student Engagement Theory (Astin, 1984), quality assurance paradigms (Harvey & Green, 1993), and higher education policy insights (Marginson, 2018)—and high reliability indices across constructs affirm the validity and robustness of the findings. These empirical benchmarks provide a solid platform for advancing to more sophisticated structural equation modeling, enabling causal inference and predictive analyses.

Looking forward, the insights gained are not only salient for Cambodia but resonate broadly with other emerging higher education systems within the Global South, striving to balance growth with quality. Policymakers, institutional leaders, and educators are thus equipped with evidence-based guidance to prioritize resource allocation, curriculum reform, faculty development, and student engagement strategies. In sum, this investigation stands as both a critical diagnostic and a call to action—a scholarly foundation that inspires deliberate, contextually relevant reforms to elevate the quality of postgraduate education, thereby enhancing Cambodia's academic reputation and socio-economic development trajectory. Future inquiry and intervention should leverage these findings to implement targeted programs, monitor progress, and foster sustained excellence in postgraduate education across the region.

7. Scope and limitations

We focus our paper on the following: (a) Top 3 Cambodian universities having a Faculty of Education, as aforementioned; (b) Data is solely based on survey results self-reported by 431 postgraduate students; and (c) Our research is focused solely on descriptive analysis.

Declaration and Statement

CRediT Authorship Contribution Statement

The authors did not provide information regarding the CRediT authorship contribution statement.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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Data Availability Statement
The data that support the findings of this study are available from the corresponding author upon reasonable request. Because the data include human participant information, they are not publicly available to protect participant privacy.

Ethical Declaration
Ethical approval is not applicable to this manuscript. All participants provided informed consent prior to their involvement in the study. They were informed about the study's purpose, procedures, and their right to withdraw at any time without consequence.

Informed Consent Statement
The authors did not provide information regarding informed consent.

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Declaration of Generative AI and AI-Assisted Technologies
The revisions of this manuscript were assisted by Gemini in Workspace (Google Docs). The authors used this tool to ensure that all formatting is strictly followed, including reference formats, and to ensure that they are free of grammatical errors. All content generated by the AI was thoroughly reviewed, edited, and validated by the authors, who take full responsibility for the final content.

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