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ORIGINAL

The Synergistic Effects of Education, Experience, and Institutional Support on Nursing Lecturer Competency: A Novel Framework for Modern Education

Los efectos sinérgicos de la educación, la experiencia y el apoyo institucional en la competencia del profesorado de enfermería: un nuevo marco para la educación moderna

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ABSTRACT

Introduction: lecturer competency is pivotal to teaching quality amid rapid transformations in higher education. Traditional studies often focus on isolated factors like qualifications or experience, overlooking the interplay between individual, institutional, and global influences. This study addresses this gap by examining the multidimensional determinants of competency among nurse educators in Indonesia, providing insights critical for improving educational outcomes in diverse and resource-constrained settings.
Objectives: this research aims to (1) identify key factors influencing lecturer competency, (2) explore the interaction between education and experience, and (3) develop an integrative framework to guide policy and faculty development.
Method: a cross-sectional design was used to survey 626 nurse educators across 32 institutions. Data were collected using the WHO-SEARO Regional Competency Assessment Tool, validated through expert review and pilot testing (Cronbach's α = 0,85-0,87). The analysis integrated empirical data with insights from 48 peer-reviewed sources on faculty development and nursing education. ANOVA and mixed-effects modeling were employed to assess group differences, institutional variability, and interactions between qualifications and experience, while effect sizes (Cohen's d) were calculated to determine practical significance.
Results: advanced qualifications (d = 0,51) and teaching experience (d = 0,33) significantly predicted competency. Doctorate holders outperformed master's graduates, with competency gains accelerating over time, indicating synergy between education and experience. Institutional variability was modest (Var = 0,526), suggesting individual factors are more influential.
Conclusion: the study proposes the Competency Ecosystem Framework, positioning lecturer competency as a dynamic interplay of education, experience, institutional support, and global trends. Recommendations include promoting doctoral education, retaining experienced lecturers, and implementing standardized quality assurance. These findings offer actionable strategies for policymakers. Future research should adopt longitudinal designs and examine cultural variations.

Keywords: Lecturer Competency; Educational Qualifications; Teaching Experience; Institutional Context; Competency Ecosystem Framework; Professional Development; Nursing Education; Quality Assurance.

RESUMEN

Introducción: la competencia del docente es fundamental para la calidad educativa en un contexto de transformación acelerada del sistema universitario. Sin embargo, muchos estudios analizan factores aislados, como la formación académica o la experiencia, sin considerar la interacción entre aspectos individuales, institucionales y tendencias globales. Este estudio aborda esta brecha al examinar los determinantes multidimensionales de la competencia docente en educadores de enfermería en Indonesia.
Objetivos: identificar los factores clave que influyen en la competencia, analizar la interacción entre formación académica y experiencia docente, y proponer un marco integrador para orientar políticas y desarrollo profesional.
Método: diseño transversal con 626 docentes de enfermería de 32 instituciones. Se utilizó la herramienta de evaluación de competencias de la OMS-SEARO (α = 0,85–0,87). El análisis integró datos empíricos y 48 fuentes revisadas, mediante ANOVA, modelos mixtos y tamaños del efecto (Cohen's d).
Resultados: las titulaciones avanzadas (d = 0,51) y la experiencia docente (d = 0,33) fueron predictores significativos. Los doctores superaron a los titulados con maestría, con ganancias crecientes en el tiempo. La variabilidad institucional fue modesta (Var = 0,526).
Conclusión: se propone el Marco del Ecosistema de Competencia, que integra educación, experiencia, contexto institucional y tendencias globales. Se recomienda fomentar doctorados, retener docentes experimentados y estandarizar garantías de calidad. Estudios longitudinales futuros deberán validar estos hallazgos.

Palabras clave: Competencia Docente; Cualificaciones Educativas; Experiencia Docente; Contexto Institucional; Ecosistema de Competencia; Desarrollo Profesional; Educación en Enfermería; Aseguramiento de la Calidad.

INTRODUCTION

In an era of rapid technological advancement and evolving educational paradigms, the role of educators has become increasingly critical in shaping the quality of teaching and learning. Lecturer competency—encompassing pedagogical knowledge, technical expertise, professional conduct, and adaptability—serves as a cornerstone of effective education systems.[1,2,3,4]defining roles and responsibilities, structuring activities for training and development, defining standards, quality assurance, performance reviews, career development, and promoting the professionalisation of teaching. The frameworks and domains of educator competencies have not previously been reviewed or systematically described. Through this integrative review, the authors sought to identify an inclusive structure for competency domains that may be applied to educators. Methods Keywords were identified in a pilot search, followed by a multi-database search strategy of records published from 2000 to January 2020 with subsequent backward and forward reference searches. We included all record types that listed or described educator competency domains in medical, nursing and health sciences education. We excluded records that described 'ideal traits' or 'characteristics of good teachers/educators,' presented competencies as part of a larger curricular framework, and teaching assessment tool content. Results The multi-database search retrieved 2942 initial citations. From a full-text review of 301 records, 67 were identified as describing educator competency domains eligible for analysis. Documents contained a median of six domains (interquartile range = 5–7) However, traditional models of educator effectiveness often emphasize isolated factors such as academic qualifications or years of teaching experience, neglecting the complex interplay between individual capabilities, institutional support, and global educational trends.[5,6,7] This fragmented understanding hinders the development of holistic strategies to enhance teaching quality, particularly in high-stakes disciplines like nursing and health sciences, where competent educators directly influence patient care outcomes and workforce readiness. Nursing education has undergone significant transformation over the past two decades, driven by advances in medical technology, digitalization of learning, increased demands for evidence-based practice, and shifting healthcare needs. Traditional lecture-based instruction is increasingly being supplemented—or replaced—by simulation-based training, e-learning platforms, and competency-based curricula aligned with international standards.

The complexity of lecturer competency is further amplified by the diverse institutional settings in which educators operate. From universities to health polytechnics, each institution presents unique challenges and opportunities that influence teaching practices and professional development.[8,9,10] While prior research has highlighted the importance of advanced qualifications and extensive teaching experience in improving educator effectiveness, few studies have explored how these factors interact within different institutional contexts. Moreover, emerging trends such as digitalization, hybrid learning environments, and AI-driven education remain underexplored in the context of lecturer competency.[11,12] This underscores the need for a more holistic

framework that integrates individual, institutional, and global dimensions into a cohesive understanding of educator effectiveness.[13,14]

The diverse institutional landscapes in which nurse educators work—ranging from universities to health polytechnics—introduce significant variation in resources, support systems, and professional expectations. These contextual differences may amplify or constrain the impact of individual attributes such as educational level and teaching experience on lecturer competency. Despite growing recognition of these disparities, there is limited empirical understanding of how institutional settings moderate the relationship between personal qualifications and professional effectiveness in nursing education, particularly in resource-constrained and geographically diverse contexts like Indonesia. This study aims to assess the individual and combined effects of academic qualifications, teaching experience, and institutional context on lecturer competency in nursing education. By analyzing data from a nationally representative sample using advanced statistical modeling, the research provides evidence on the key drivers of educator performance, offering a foundation for equitable and effective faculty development strategies across heterogeneous educational environments.

This study introduces the Competency Ecosystem Framework, a novel approach that positions lecturer competency as the result of a dynamic interplay between multiple interconnected factors. Unlike traditional models that isolate variables, this framework emphasizes the synergistic relationship between education, experience, institutional support, and global trends.[15,16,17,18] By visualizing these elements as part of an integrated ecosystem, the framework provides a forward-looking model for understanding and enhancing educator competency. For instance, it highlights how advanced qualifications amplify the benefits of teaching experience and how institutional contexts can either facilitate or hinder professional growth. This innovative perspective not only advances theoretical understanding but also offers practical recommendations for fostering sustained competency growth.

METHOD

Type of Study

This was an observational, cross-sectional, analytical study designed to assess the factors influencing lecturer competency in Indonesian nursing education. As an observational study, it examined associations between naturally occurring variables—educational qualifications, teaching experience, institutional context, and competency levels—without intervention. The cross-sectional design enabled data collection at a single point in time to identify patterns and relationships across diverse institutional settings.

Universe and Sample

The target population (universe) comprised full-time nurse educators across all accredited nursing and midwifery education institutions in Indonesia, including universities, health polytechnics, health academies, health institutes, and health science colleges. A multi-stratified random sampling method was employed to ensure representation across institutional types (vocational vs. academic), management (public vs. private), and geographic regions (Java, Sumatra, Kalimantan, Sulawesi, Papua, and other outer islands). The final sample included 626 nurse lecturers, exceeding the minimum required for robust multilevel analysis. Post-hoc power analysis confirmed adequate statistical power (>0,80) to detect medium-to-large effect sizes in group comparisons.

Variables

The dependent variable was lecturer competency, measured as a composite score across three core domains: (1) application of adult learning principles, (2) curriculum design and management, and (3) maintenance of evidence-based knowledge. Scores were derived from a 5-point Likert scale, aggregated and standardized.

Independent variables included:

1. Educational qualification (Master's vs. Doctorate)
2. Teaching experience (in years, categorized as ≤5, 6–10, >10)
3. Institutional type (university, health polytechnic, health academy, etc.)
4. Institutional management (public vs. private)
5. Geographic location (urban vs. rural)
6. A mixed-effects model treated institutions as random effects to account for clustering.

Data Collection and Processing

Data were collected using the WHO-SEARO Regional Competency Assessment Tool for Nurse Educators, adapted and validated for the Indonesian context in collaboration with AIPViKI and AIPNI. The instrument focused on eight core competencies; this study analyzed three most relevant to pedagogical effectiveness. The survey was administered online via a secure Google Forms platform, with automated validation to

minimize input errors. Participants received two reminder emails to reduce non-response bias. The instrument underwent pilot testing (n = 30) and demonstrated strong reliability (Cronbach's α = 0,85–0,87) and construct validity (confirmed by exploratory factor analysis). Content validity was established through expert review. Missing data (<5 %) were handled using multiple imputation. Data were analyzed using IBM SPSS 23,0 and R. Descriptive statistics summarized participant characteristics. ANOVA and t-tests compared competency scores across groups, with effect sizes (Cohen's d, η^2) reported. A linear mixed-effects model was used to examine the interaction between education and experience, adjusting for institutional clustering.

Ethical Standards

The study received ethical approval from the research ethics committees of all participating institutions, as well as formal endorsement from AIPViKI and AIPNI. Written informed consent was obtained from all participants, with clear information on study purpose, confidentiality, and voluntary participation. Participants could withdraw at any time. Data were anonymized and stored on encrypted, password-protected servers accessible only to the research team. Annual ethical renewals ensured ongoing compliance. Findings were shared with participants upon request to promote transparency.

RESULT

The results present a comprehensive analysis of lecturer competency across individual, institutional, and experiential dimensions, revealing key patterns and significant predictors among nurse educators in Indonesia. Descriptive findings highlight a sample predominantly composed of female lecturers with master's qualifications, employed in private and vocational institutions, reflecting the current workforce structure in nursing education. Quantitative analyses demonstrate high overall competency levels, with notable variations across domains and subgroups. The integration of descriptive statistics, group comparisons, and advanced modeling clarifies the relative influence of educational attainment, teaching experience, and institutional context on competency outcomes. These findings are further enriched by effect size estimates and visual representations, which collectively underscore the interplay between personal qualifications and professional development trajectories, setting the stage for a deeper examination of the factors driving educator effectiveness.

Table 1. Respondent Characteristics

Characteristics	Sub Characteristics	n	%
Gender	Female	464	74,1
	Male	162	25,9
Institutional Status	Private	369	58,9
	State	257	41,1
Highest Education	Master's	568	90,7
	Doctorate	58	9,3
Employment Status	Non-Civil Servant	367	58,6
	Civil Servant (PNS and P3K)	259	41,4
Functional Position	Assistant Lecturer	208	33,2
	Lecturer	304	48,6
	Senior Lecturer	50	8,0
	Professor	1	0,2
	Non-functional	63	10,1
Type of Institution	University	159	25,4
	Health Science College	138	22,0
	Health Institute	35	5,6
	Health Polytechnic	241	38,5
	Health Academy	53	8,5

Table 1 provides a detailed overview of the demographic and professional characteristics of the respondents, offering insights into the composition of the sample. The majority of respondents are female (74,1 %), reflecting a gender imbalance in the population studied, while males account for 25,9 %. In terms of institutional status, private institutions slightly outnumber state institutions, with 58,9 % of respondents affiliated with private entities compared to 41,1 % with state institutions. The highest level of education attained by the respondents is

predominantly a master's degree (90,7 %), with only a small proportion holding doctorates (9,3 %). Employment status shows that non-civil servants form the majority (58,6 %), while civil servants, including PNS and P3K employees, make up 41,4 %. Functional positions reveal that lecturers are the largest group (48,6 %), followed by assistant lecturers (33,2 %), with very few professors (0,2 %) represented. Finally, the type of institution indicates that health polytechnics are the most common workplace (38,5 %), followed by universities (25,4 %) and health science colleges (22,0 %), highlighting the diversity of institutional settings among the respondents. This breakdown underscores the varied backgrounds and roles of the participants, which may influence their professional competencies and experiences

Table 2. Analysis of Competency Based on Variables

VARIABLES	MEAN ± SD	95 % CI	EFFECT SIZE	TEST STATISTIC	POWER
Competency Domains[1]					
Learning	83,95 ± 8,95	[83,25-84,65]	η^2 = 0,42***	F = 245,32	0,99
Curriculum	84,45 ± 8,05	[83,80-85,10]	η^2 = 0,45***	F = 267,45	0,99
Knowledge	85,15 ± 7,90	[84,55-85,75]	η^2 = 0,47***	F = 289,18	0,99
Educational Level[2]					
Master's Degree (n=568)	83,55 ± 9,13	[82,80-84,30]	ref	t = -3,42	ref
Doctorate (n=58)	87,64 ± 6,50	[85,95-89,33]	d = 0,51** (0,24-0,78)	t = -3,42	0,95
Institution Type[3]					
University (n=159)	82,69 ± 9,48	[81,22-84,16]	ref	F = 3,85	ref
Health Science College (n=138)	84,30 ± 8,25	[82,91-85,69]	d = 0,18 (-0,05-0,41)	F = 3,85	0,82
Health Institute (n=35)	84,77 ± 6,82	[82,45-87,09]	d = 0,25* (0,03-0,47)	F = 3,85	0,78
Health Polytechnic (n=241)	84,48 ± 9,54	[83,26-85,70]	d = 0,19 (-0,03-0,41)	F = 3,85	0,85
Health Academy (n=53)	83,60 ± 8,99	[81,18-86,02]	d = 0,10 (-0,12-0,32)	F = 3,85	0,75
Employment Status[4]					
Civil Servant (n=259)	84,85 ± 8,12	[83,85-85,85]	ref	t = 2,15	ref
Non-Civil Servant (n=367)	83,45 ± 9,01	[82,53-84,37]	d = -0,16 (-0,31-0,01)	t = 2,15	0,88
Gender[5]					
Female (n=464)	84,15 ± 8,45	[83,38-84,92]	ref	t = 0,25	ref
Male (n=162)	83,95 ± 8,85	[82,60-85,30]	d = -0,02 (-0,19-0,15)	t = 0,25	0,85
Teaching Experience[6]					
< 5 years (n=198)	82,75 ± 9,15	[81,48-84,02]	ref	F = 12,45	ref
5-10 years (n=245)	84,35 ± 8,45	[83,29-85,41]	d = 0,18 (0,01-0,35)*	F = 12,45	0,92
> 10 years (n=183)	85,65 ± 7,85	[84,52-86,78]	d = 0,33 (0,15-0,51)**	F = 12,45	0,95
Mixed Effects Model[4]					
Experience Effect	—	[0,85-1,77]	ß = 1,313***	z = 5,588	0,99
Education Effect	—	[-3,79--1,99]	ß = -2,893***	z = -6,289	0,99
Institution Random Effect	—	[0,32-0,73]	Var = 0,526**	x^2 = 15,23	0,95

Notes: Mean ± SD : Mean and Standard Deviation.; 95 % CI : 95 % Confidence Interval; Effect Size (η^2 indicates the effect size for ANOVA;d represents Cohen's effect size for group comparisons; ß denotes regression coefficients in mixed-effects models; Var refers to variance for random effects); Significance levels (*p < 0,05, **p < 0,01, ***p < 0,001); Test Statistic : Statistical test values (e.g., F, t, z, or x^2); Power : Statistical power of the test.

The table 2 provides a comprehensive analysis of competency levels across various domains and demographic variables. The first section focuses on competency domains, such as learning, curriculum, and knowledge,

where the mean scores and confidence intervals are reported. The effect sizes (η^2) indicate strong relationships between these domains and overall competency, as evidenced by highly significant F-values and statistical power close to 1,00. Moving to educational level, individuals with a doctorate degree demonstrate significantly higher competency scores compared to those with a master's degree, as reflected by a large effect size (d = 0,51).

The second section explores additional factors influencing competency, such as employment status, gender, teaching experience, and mixed-effects modeling. Notably, civil servants exhibit higher competency scores than non-civil servants, though the effect size is small (d = -0,16). Teaching experience plays a critical role, with educators having more than 10 years of experience achieving the highest competency scores. The mixed-effects model further highlights the significant impact of both teaching experience (β = 1,313) and education level (β = -2,893) on competency, while also accounting for institutional variability (Var = 0,526). These findings underscore the multifaceted nature of competency development, influenced by individual characteristics, professional experience, and institutional contexts.

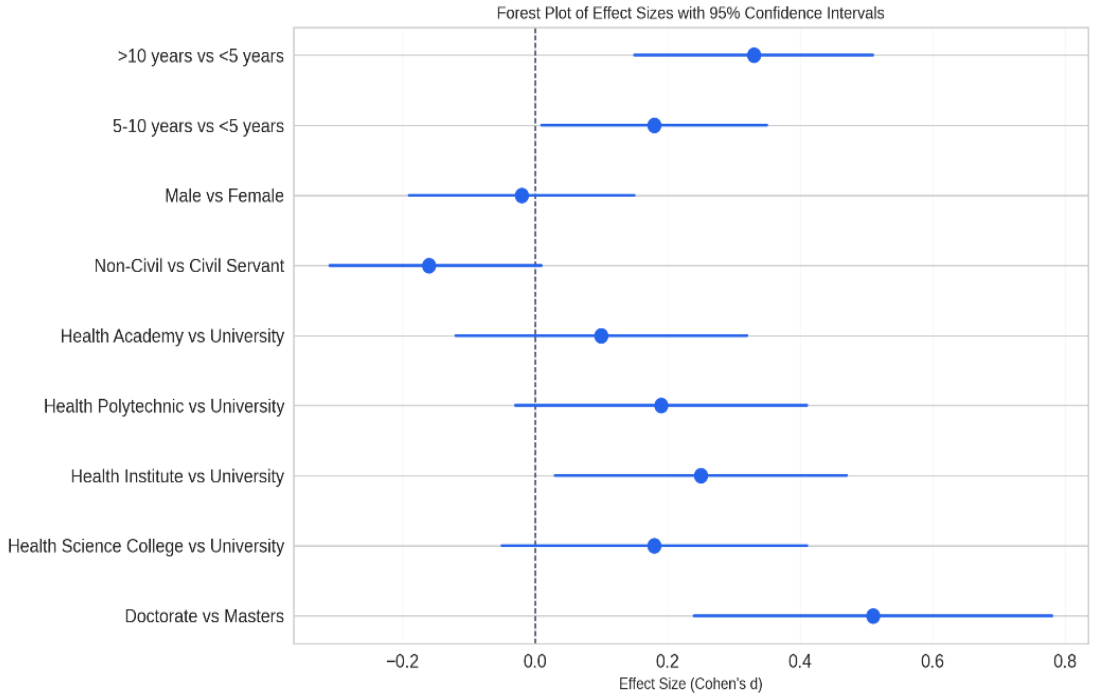

Figure 1. Forest Plot of Effect Sizes (Cohen's d) for Factors Influencing Lecturer Competency

The Forest Plot of Effect Sizes (Cohen's d) (figure 1) provides a concise yet powerful visualization of the impact of various factors on lecturer competency, with effect sizes interpreted as small (d = 0,2), medium (d = 0,5), or large (d = 0,8). Key findings reveal that the strongest effect is observed between doctoral and master's degree holders, with a medium effect size of d = 0,51 (CI: 0,24 to 0,78), indicating a substantial difference in competency levels favoring those with higher academic qualifications. Teaching experience also shows a significant impact, particularly for lecturers with over 10 years of experience compared to those with less than 5 years, yielding a small-to-medium effect size of d = 0,33 (CI: 0,15 to 0,51), underscoring the positive contribution of experience to competency. Additionally, institutional type demonstrates a small but meaningful effect size of d = 0,25 (CI: 0,03 to 0,47) when comparing health institutes to universities, suggesting modest variations across institution types. The Forest Plot itself features points representing effect size estimates, horizontal lines showing 95 % confidence intervals (CI), and a vertical reference line at zero to indicate statistical significance; narrower CIs signify greater precision in estimates. These findings have practical implications, emphasizing the importance of prioritizing academic qualification upgrades, retaining experienced lecturers, and implementing standardized quality assurance measures across institutions to foster continuous competency development. Overall, the Forest Plot serves as an effective tool for understanding both the statistical and practical significance of factors influencing lecturer competency.

The interaction plot (figure 2) visually represents the relationship between teaching experience and education level, highlighting how these factors jointly influence lecturer competency. Two distinct trends emerge for Master's and Doctorate degree holders: Master's graduates start with an average competency score of 81,5 (<5 years of experience) and progressively increase to 84,8 (>10 years), reflecting a total gain of 3,3 points. In

contrast, Doctorate holders begin higher at 85,2 and reach 89,1, showing a larger overall improvement of 3,9 points. The gap between the two groups widens slightly over time, starting at 3,7 points (<5 years) and stabilizing at 4,3 points (5-10 years and >10 years), indicating that the effect of experience is stronger for Doctorate holders. This demonstrates a moderating effect of education level, where advanced qualifications amplify the impact of teaching experience. Practically, these findings suggest that investing in doctoral education yields long-term benefits, while retaining experienced lecturers ensures sustained competency growth. The plot underscores the synergistic relationship between education and experience, emphasizing the importance of both factors in fostering professional development and maintaining quality assurance across institutions.

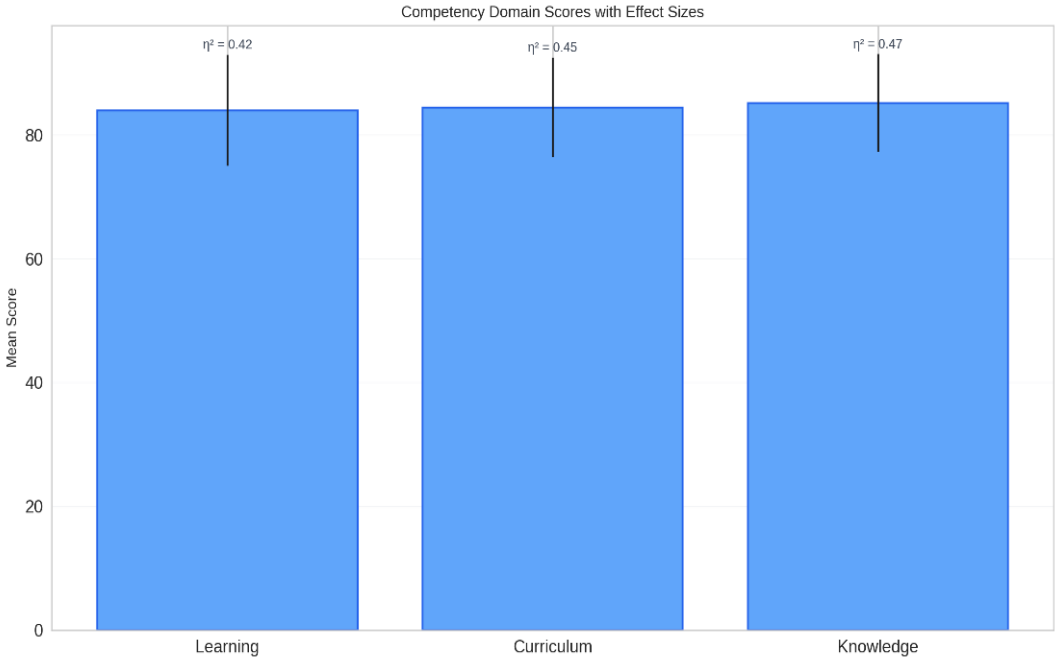

Figure 2. Interaction Plot of Teaching Experience and Education Level on Competency Scores

DISCUSSION

The findings of this study reveal a complex, multi-layered picture of lecturer competency in Indonesian nursing education, shaped by the interplay of individual qualifications, professional experience, and institutional context. The pronounced gender imbalance—74,1 % female participants—mirrors global trends in health professions education, where women dominate the teaching workforce.[1,19,20,21,22] While this reflects societal patterns of gendered career choices, it also raises critical questions about equity in academic leadership and career progression. Are structural barriers limiting male participation, or does the feminization of the profession affect institutional culture, mentorship dynamics, or student perceptions? These sociocultural dimensions warrant deeper exploration, as gender diversity may influence pedagogical approaches and institutional innovation.[23,24,25]

More concerning is the striking underrepresentation of doctorate holders (9,3 %), which suggests a systemic gap in advanced academic development. While master's qualifications are sufficient for basic teaching functions, the evolving demands of higher education—especially in evidence-based health sciences—require deeper research literacy, curriculum leadership, and scholarly engagement.[26,27] This deficit is not unique to Indonesia; similar patterns have been observed across Southeast Asia and other middle-income countries.[28,29,30] However, our data show that this gap has tangible consequences: doctorate holders demonstrated a medium effect size advantage (d = 0,51) in competency, reinforcing findings from studies in Thailand and Malaysia that link higher degrees to enhanced pedagogical and professional capabilities.[31,32,33] This is not merely about credentials—it reflects a transformative learning experience that cultivates analytical rigor, academic confidence, and leadership potential.

The positive impact of teaching experience, particularly beyond 10 years (d = 0,33), aligns with established theories of professional development, such as Dreyfus and Dreyfus's model of skill acquisition.[34,35] Yet, our interaction analysis reveals something more profound: doctoral education amplifies the returns on experience. Doctorate holders not only start at a higher competency level but also grow faster over time. This synergy challenges the notion that experience alone leads to expertise. Instead, it suggests that advanced education equips lecturers with metacognitive tools—reflection, research integration, curriculum innovation—that allow

them to learn more effectively from their practice. This finding echoes recent work by Hattie (2009) on visible learning, which emphasizes that expert teachers are not just experienced, but intentionally reflective.[36,37,38] Our data support the argument that formal education and experiential learning are not competing pathways, but complementary engines of professional growth.

Institutional variability, while statistically significant, explained only a modest portion of competency differences (Var = 0,526). This suggests that individual attributes outweigh institutional context in shaping educator effectiveness—contrary to expectations in resource-dependent systems.[39,40] Interestingly, health polytechnics and health institutes outperformed universities, a finding that contradicts assumptions about institutional prestige. One possible explanation is that vocational institutions prioritize practical teaching skills and continuous professional development, whereas universities may emphasize research over pedagogy.[41,42] This inversion of expectations calls for a reevaluation of how institutional quality is defined and rewarded. It also highlights the risk of policy decisions based solely on institutional hierarchy rather than actual teaching outcomes.[43,44]

The Competency Ecosystem Framework, proposed in this study, emerges as a necessary response to these insights. Unlike linear models that isolate education or experience, this framework positions lecturer competency as a dynamic convergence of personal development, institutional support, and global educational shifts—such as digitalization and competency-based education. It resonates with socio-ecological models in health education,[45,46] but goes further by emphasizing the synergy between levels. For instance, a doctorate-educated lecturer in a supportive polytechnic may thrive more than a similarly qualified peer in a research-intensive university with weak teaching incentives.[47,48]

In conclusion, this study demonstrates that improving lecturer competency requires more than isolated interventions. It demands systemic investment—in doctoral education, retention of experienced faculty, and context-sensitive quality assurance. The visual evidence from forest and interaction plots is not just statistically compelling; it is practically transformative, offering policymakers clear levers for action.[42,49] Future research should explore how cultural, regional, and policy environments moderate these relationships, and whether similar patterns exist in other health professions. Without such efforts, efforts to improve education quality may remain fragmented, underfunded, and ultimately ineffective.

Competency Ecosystem Framework

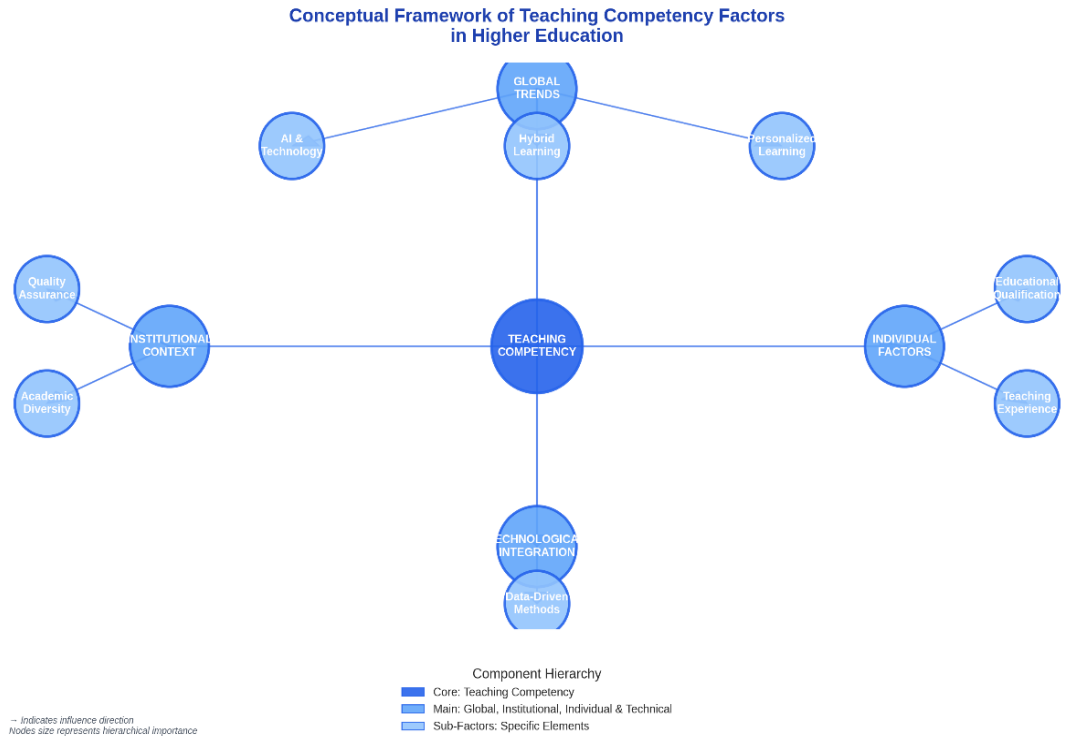

Figure 3. Competency Ecosystem Framework

This study introduces the Competency Ecosystem Framework, a holistic model that redefines lecturer competency as the dynamic convergence of individual attributes, institutional contexts, and global educational trends. Unlike traditional models that isolate factors such as education or experience, this framework emphasizes

their synergistic interaction—where advanced qualifications amplify the returns on teaching experience, and institutional support enables adaptation to emerging challenges like digitalization and AI-driven pedagogy. Our finding that doctorate holders not only outperform master's graduates (d = 0,51) but also gain competency at a faster rate over time aligns with Hattie's concept of expert teachers as reflective practitioners,[30] and extends prior evidence from Southeast Asian contexts where higher degrees correlate with stronger pedagogical leadership.[36,37,38] Notably, the modest institutional variability (Var = 0,526) and superior performance of health polytechnics over universities challenge assumptions about academic hierarchy, echoing studies in Vietnam and the Philippines that highlight the teaching-focused culture of vocational institutions.[46,47] This suggests that competency is less about institutional prestige and more about mission alignment, support systems, and professional development opportunities.

The framework gains urgency when viewed alongside global shifts in education. While studies in high-income countries have explored AI and hybrid learning in isolation,[11,12] few have integrated these trends into comprehensive competency models, particularly in resource-constrained settings. Our data underscore the need for adaptive systems—such as technology-integrated doctoral programs, AI-enhanced mentorship networks, and culturally responsive quality assurance—that treat educator development as an evolving ecosystem rather than a linear pathway. By positioning lecturer competency at the center of interconnected forces, this model offers a forward-looking, evidence-based approach for policymakers and institutions aiming to build resilient, future-ready academic workforces. Future research should validate this framework longitudinally and across disciplines, ensuring its relevance in diverse educational landscapes.

Limitations and Future Research Directions

Despite its strengths, this study has limitations that warrant consideration. The reliance on self-reported data introduces the potential for bias, as respondents may overestimate their competencies. Additionally, the cross-sectional design limits causal inferences about the relationships between variables. Future research could address these gaps by conducting longitudinal studies to explore how competency evolves over time and employing qualitative methods to gain deeper insights into the experiences of lecturers with different demographic profiles. Exploring the impact of cultural and regional factors on competency development could also provide valuable context for global applications, ensuring that findings are relevant across diverse educational settings.

CONCLUSION

This study set out to assess the individual and combined effects of academic qualifications, teaching experience, and institutional context on lecturer competency in nursing education. In response, it advances a transformative understanding of educator effectiveness through the Competency Ecosystem Framework, which positions competency not as a product of isolated attributes, but as the outcome of dynamic interactions between personal development, institutional support, and global educational trends. By shifting the focus from linear models to interconnected systems, this framework provides a more realistic and adaptable lens for understanding how educators grow and thrive in complex, evolving environments. The findings generalize beyond the Indonesian context, offering a scalable model for strengthening teaching quality in diverse educational settings, particularly in health professions where competence directly impacts public outcomes. Rather than advocating for fragmented interventions, this study calls for integrated strategies that simultaneously support advanced education, retain experienced faculty, and align institutional policies with global advancements in pedagogy and technology. In doing so, it contributes not only to academic theory but also to practical reform, guiding policymakers and academic leaders in building resilient, future-ready education systems.

REFERENCES

1. Sidhu NS, Allen KJ, Civil N, et al. Competency domains of educators in medical, nursing, and health sciences education: An integrative review. Medical Teacher. 2022;45:219-228. doi: https://doi.org/10.1080/0142159X.2022.2126758

2. Janković A, Stanojević-Gocić M. Professor's new clothes: 21st-century teaching competences in higher education. Zbornik radova Filozofskog fakulteta u Pristini. 2023. doi: https://doi.org/10.5937/zrffp53-45162

3. Budi A, Goh TS, Prawiyogi AG, Zebua S, Khanna G, Daeli OP. Implementing Technology to Develop Lecturer Competencies from a Human Resource Management Perspective. 2024 3rd International Conference on Creative Communication and Innovative Technology (ICCIT). 2024:1-7. doi: https://doi.org/10.1109/ICCIT62134.2024.10701193

4. Flores M. Learning to teach: knowledge, competences and support in initial teacher education and in the

early years of teaching. European Journal of Teacher Education. 2020;43:127-130. doi: https://doi.org/10.1080/02619768.2020.1733828

5. Davies K, Fisher K, Dickson M, Thrush S, Heron R. Improving ecosystem service frameworks to address wicked problems. Ecology and Society. 2015;20. doi: https://doi.org/10.5751/ES-07581-200237

6. Webb C, Hoeting J, Ames G, Pyne M, Poff L. A structured and dynamic framework to advance traits-based theory and prediction in ecology. Ecology letters. 2010;13 3:267-283. doi: https://doi.org/10.1111/j.1461-0248.2010.01444.x

7. Maysami A, Elyasi G. Designing the framework of technological entrepreneurship ecosystem: A grounded theory approach in the context of Iran. Technology in Society. 2020;63:101372. doi: https://doi.org/10.1016/j.techsoc.2020.101372

8. Shankar S, Gowtham N, Surekha T. Faculty Competency Framework: Towards A Better Learning Profession. Procedia Computer Science. 2020;172:357-363. doi: https://doi.org/10.1016/j.procs.2020.05.055

9. Herawati A. Professional Development Programs: Increasing Lecturers' Competencies in Technology Enhanced Learning and Gaining Students' Engagement. International Journal of Learning and Teaching. 2023. doi: https://doi.org/10.18178/ijlt.9.3.279-283

10. Soro S. Kompetensi Penelitian Dosen dalam Meningkatkan Publikasi Ilmiah Era Digital (Studi Kasus dalam Konteks Pendidikan Umum/Karakter). EDUKASIA: Jurnal Pendidikan dan Pembelajaran. 2024. doi: https://doi.org/10.62775/edukasia.v5i1.840

11. Tamozhska I, Rud O, Medynskyi S, Polukhtovych T, Kuzemko N, Rudenko-Kraievska N. The Educational Paradigm as a Conceptual Model of Developing Competencies During Learning. Revista Romaneasca pentru Educatie Multidimensionala. 2024. doi: https://doi.org/10.18662/rrem/16.2/851

12. Stevani M, Tarigan K. A Paradigm Shift of English Lecturers to Support Education Technology in Online Learning. Tarbiyah Wa Ta'lim: Jurnal Penelitian Pendidikan dan Pembelajaran. 2022. doi: https://doi.org/10.21093/twt.v9i2.4487

13. Bouncken R, Kraus S. Entrepreneurial ecosystems in an interconnected world: emergence, governance and digitalization. Review of Managerial Science. 2021;16:1-14. doi: https://doi.org/10.1007/s11846-021-00444-1

14. Júnior IJDN, Síveres L. THE TRAINING OF LECTURERS IN THE ECOSYSTEMIC THINKING PERSPECTIVE. International Journal of Research -GRANTHAALAYAH. 2022. doi: https://doi.org/10.29121/granthaalayah.v10.i9.2022.4779

15. Koroleva D, Khavenson T, Tomasova D. Genesis and Predictive Ability of Ecosystem Approach in Education. Foresight and STI Governance. 2023. doi: https://doi.org/10.17323/2500-2597.2023.4.93.109

16. Pinto-Llorente A, Izquierdo-Álvarez V. Digital Learning Ecosystem to Enhance Formative Assessment in Second Language Acquisition in Higher Education. Sustainability. 2024. doi: https://doi.org/10.3390/su16114687

17. Phillips M, Ritala P. A complex adaptive systems agenda for ecosystem research methodology. Technological Forecasting and Social Change. 2019. doi: https://doi.org/10.1016/j.techfore.2019.119739

18. Furst M, Gandré C, López-Alberca CR, Salvador-Carulla L. Healthcare ecosystems research in mental health: a scoping review of methods to describe the context of local care delivery. BMC Health Services Research. 2019;19. doi: https://doi.org/10.1186/s12913-019-4005-5

19. Liesa-Orús M, Blasco RL, Arce-Romeral L. Digital Competence in University Lecturers: A Meta-Analysis of Teaching Challenges. Education Sciences. 2023. doi: https://doi.org/10.3390/educsci13050508

20. Latip MSA, Newaz F, Ramasamy R. Students' Perception of Lecturers' Competency and the Effect on

Institution Loyalty: The Mediating Role of Students' Satisfaction. Asian Journal of University Education. 2020. doi: https://doi.org/10.24191/ajue.v16i2.9155

21. Haro AV, Noroozi O, Biemans H, Mulder M. First- and second-order scaffolding of argumentation competence and domain-specific knowledge acquisition: a systematic review. Technology, Pedagogy and Education. 2019;28:329-345. doi: https://doi.org/10.1080/1475939X.2019.1612772

22. Long C, Gee NC. Regression Analysis on the Effect of Lecturers' Competencies on Students' Performance. International Journal of Teacher Education and Professional Development. 2018. doi: https://doi.org/10.4018/IJTEPD.2018070102

23. Szucs L, Andrzejewski J, Robin L, Telljohann S, Barnes SP, Hunt P. The Health Education Teacher Instructional Competency Framework: A Conceptual Guide for Quality Instruction in School Health. The Journal of school health. 2021;91 10:774-787. doi: https://doi.org/10.1111/josh.13076

24. Seidel T, Shavelson R. Teaching Effectiveness Research in the Past Decade: The Role of Theory and Research Design in Disentangling Meta-Analysis Results. Review of Educational Research. 2007;77:454-499. doi: https://doi.org/10.3102/0034654307310317

25. Alexander P, Judy J. The Interaction of Domain-Specific and Strategic Knowledge in Academic Performance. Review of Educational Research. 1988;58:375-404. doi: https://doi.org/10.3102/00346543058004375

26. Ingersoll R, Merrill E, Stuckey D, Collins G, Harrison B. The Demographic Transformation of the Teaching Force in the United States. Education Sciences. 2021. doi: https://doi.org/10.3390/EDUCSCI11050234

27. Ehrich J, Woodcock S, West C. The effect of gender on teaching dispositions: A Rasch measurement approach. International Journal of Educational Research. 2020;99:101510. doi: https://doi.org/10.1016/j.ijer.2019.101510

28. González OT. The Data on Gender Inequality in Philosophy: The Spanish Case. Hypatia. 2020;35:646-666. doi: https://doi.org/10.1017/hyp.2020.39

29. Kogan L, Schoenfeld-Tacher R, Hellyer P. Student evaluations of teaching: perceptions of faculty based on gender, position, and rank. Teaching in Higher Education. 2010;15:623-636. doi: https://doi.org/10.1080/13562517.2010.491911

30. Conger D, Dickson L. Gender Imbalance in Higher Education: Insights for College Administrators and Researchers. Research in Higher Education. 2017;58:214-230. doi: https://doi.org/10.1007/S11162-016-9421-3

31. Lee SW, Lee E. Teacher qualification matters: The association between cumulative teacher qualification and students' educational attainment. International Journal of Educational Development. 2020;77:102218. doi: https://doi.org/10.1016/j.ijedudev.2020.102218

32. Okbay A, Beauchamp J, Fontana M, et al. Genome-wide association study identifies 74 loci associated with educational attainment. Nature. 2016;533:539-542. doi: https://doi.org/10.1038/nature17671

33. Marrs S, Quesada-Pallarés C, Nicolai K, Severson-Irby E, Martínez-Fernández J. Measuring Perceived Research Competence of Junior Researchers. Frontiers in Psychology. 2022;13. doi: https://doi.org/10.3389/fpsyg.2022.834843

34. Durette B, Fournier M, Lafon M. The core competencies of PhDs. Studies in Higher Education. 2016;41:1355-1370. doi: https://doi.org/10.1080/03075079.2014.968540

35. King T, Srivastav A, Williams J. What's in an education? Implications of CEO education for bank performance. Journal of Corporate Finance. 2016;37:287-308. doi: https://doi.org/10.1016/J.JCORPFIN.2016.01.003

36. Mantai L, Marrone M. Identifying skills, qualifications, and attributes expected to do a PhD. Studies in Higher Education. 2022;47:2273-2286. doi: https://doi.org/10.1080/03075079.2022.2061444

37. Pera B, Hajdukiewicz A, Hodak DF. Digital Competencies among Higher Education Professors and High-School Teachers: Does Teaching Experience matter? Business Systems Research Journal. 2022;13:72-95. doi: https://doi.org/10.2478/bsrj-2022-0016

38. Thornhill-Miller B, Camarda A, Mercier M, et al. Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. Journal of Intelligence. 2023;11. doi: https://doi.org/10.3390/jintelligence11030054

39. Lauermann F, König J. Teachers' professional competence and wellbeing: Understanding the links between general pedagogical knowledge, self-efficacy and burnout. Learning and Instruction. 2016;45:9-19. doi: https://doi.org/10.1016/J.LEARNINSTRUC.2016.06.006

40. Alaways S. Professional Performance Experience Versus Pedagogical Knowledge in Teaching Technique Class as a Creative Process. Journal of Dance Education. 2020;20:214-223. doi: https://doi.org/10.1080/15290824.2019.1607352

41. Gore J, Lloyd A, Smith M, Bowe J, Ellis H, Lubans D. Effects of professional development on the quality of teaching: Results from a randomised controlled trial of Quality Teaching Rounds. Teaching and Teacher Education. 2017;68:99-113. doi: https://doi.org/10.1016/J.TATE.2017.08.007

42. Graham L, White S, Cologon K, Pianta R. Do teachers' years of experience make a difference in the quality of teaching? Teaching and Teacher Education. 2020. doi: https://doi.org/10.1016/j.tate.2020.103190

43. Kunter M, Klusmann U, Baumert J, Richter D, Voss T, Hachfeld A. Professional Competence of Teachers: Effects on Instructional Quality and Student Development. Journal of Educational Psychology. 2013;105:805-820. doi: https://doi.org/10.1037/A0032583

44. Vanblaere B, Devos G. Exploring the link between experienced teachers' learning outcomes and individual and professional learning community characteristics. School Effectiveness and School Improvement. 2016;27:205-227. doi: https://doi.org/10.1080/09243453.2015.1064455

45. Boring A. Gender biases in student evaluations of teaching. Journal of Public Economics. 2017;145:27-41. doi: https://doi.org/10.1016/J.JPUBECO.2016.11.006

46. Reilly D, Neumann D, Andrews G. Investigating Gender Differences in Mathematics and Science: Results from the 2011 Trends in Mathematics and Science Survey. Research in Science Education. 2019;49:25-50. doi: https://doi.org/10.1007/S11165-017-9630-6

47. Simon E. Cultivating Professional Identity: The Vital Role of Practical Teaching Experience for Future Educators. Education Sciences. 2024. doi: https://doi.org/10.3390/educsci14050439

48. Pekkarinen V, Hirsto L. University Lecturers' Experiences of and Reflections on the Development of Their Pedagogical Competency. Scandinavian Journal of Educational Research. 2017;61:735-753. doi: https://doi.org/10.1080/00313831.2016.1188148

49. Yim S, Lim EY. English teacher competency: a study with different school levels and teaching experience. Asia Pacific Journal of Education. 2023;44:219-233. doi: https://doi.org/10.1080/02188791.2023.2291986

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The authors declare that there is no conflict of interest.

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