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Graduate students' competence and readiness for research

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ABSTRACT

Research competence forms the foundation of graduate students' academic success and their ability to contribute meaningfully to scholarly output. This study examines the relationship between research competence and research readiness among 224 graduate students from MA in education, EdD, and PhD in Laguna State Polytechnic University selected through a non- random sampling technique, specifically purposive sampling. These participants, who had all completed a research subject, responded to a validated, researcher-developed 5-point Likert scale questionnaire. The study employed quantitative methods, including mean comparison, Spearman rank correlation, and Mann-Whitney U tests, to analyze the data. Findings revealed a strong positive correlation between students' research competence and their readiness to engage in the research process. Notably, doctoral students demonstrated higher levels of both competence and readiness compared to master's students. While competence levels were relatively consistent across programs, readiness significantly differed. These results highlight the need for program-level interventions that provide targeted research training and support, contributing to more effective curriculum design and evidence-based policy-making in graduate education.

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1. INTRODUCTION

Research competence is integrated set of knowledge, skills, and attitudes necessary to conduct rigorous, ethical, and meaningful research. Research readiness, meanwhile, is defined as a graduate student's preparedness to engage in the full research process, which includes conceptualization, design, data collection, analysis, and dissemination. These two constructs are central to the development of capable and independent researchers. However, the interaction between them remains underexplored, particularly in the Philippine context. Higher education plays important role in advancing the sustainable development goals (SDGs), particularly through scientific research and innovation. In this regard, academic literacy has become a critical pillar of higher education, especially in developing nations such as the Philippines. Graduate students many of whom are practicing teachers take on dual roles as educators and researchers. As such, they are expected to build strong research competence not only for academic success but also for professional advancement. Within higher education institutions (HEIs), thesis writing and research projects are integral components of graduate programs. These academic requirements are designed to develop both technical research skills and the values that support ethical and responsible scholarly practice [1].

A holistic view of research competence, encompassing knowledge, skills, and attitudes prepares students to become reflective, socially engaged researchers who contribute meaningfully to academic and societal progress. Despite the central role of research in graduate education, many students encounter challenges

in navigating the research process. Understanding how research competence influences readiness is therefore crucial to strengthening graduate education and ensuring targeted support and training for future researchers [2].

Research is a vital component of both undergraduate and graduate education, with heightened expectations at the graduate level, where students must demonstrate advanced research and information-handling skills to complete a thesis or dissertation. However, many struggle with critical tasks such as using technology, conducting literature reviews, analyzing data, and effectively reporting their findings—barriers that often hinder successful thesis completion [3]. To address these challenges, developing research skills such as critical thinking, academic writing, literature review techniques, and research methodology is essential for enhancing students' research competence and improving educational outcomes [4]. Central to this is research literacy—the ability to locate, evaluate, and apply scientific information for evidence-based decision-making in educational contexts.

Research-based learning (RBL) has been identified as an effective strategy for fostering these competencies, promoting self-directed learning, problem-solving, and critical inquiry [5]. Particularly in graduate-level pedagogy programs, research competence equips students to apply findings to real-world teaching practice and engage in reflective, evidence-based instruction [6]. To support this development, integrating research activities into the curriculum, offering mentorship opportunities, and cultivating a supportive research culture are crucial for strengthening students' research skills, confidence, and positive attitudes toward scholarly inquiry [7].

This study examines the relationship between graduate students' research competence and their research readiness. As well as the significant differences in research competence and readiness among students when grouped according to their degree programs. This study lies in its comprehensive assessment of both research competence and readiness across all key phases of the research process-conceptualization, design and planning, empirical work, analysis, and dissemination among students from various graduate programs. By simultaneously examining these constructs, the study provides a nuanced understanding of students' strengths and areas for development. It also explores how disciplinary context shapes research readiness. This integrative approach fills a gap in both local and international literature by offering evidence-based insights specific to Philippine graduate students. Ultimately, the study contributes to enhancing graduate education quality by informing targeted interventions and policy development.

Research competence is vital for students to adapt to a constantly changing world and should be developed early in university education. However, existing studies note that this goal is difficult to achieve when research skills are taught indirectly across various subjects, without a unified and coordinated approach within and across universities. To improve research competence, graduate students should strengthen their skills in English writing, research design, and data analysis [8], [9]. In this context, readiness plays a key role in determining research outcomes, as it reflects students' knowledge, attitudes, and behaviors toward research preparation. Research readiness is also associated with the challenges students encounter during the research process [10], [11].

Moreover, academic research conducted by highly educated individuals contributes significantly to both scientific advancement and practical aspect of sustainable development. It reflects students' academic achievement, motivation, and engagement, and is closely linked to technological innovation. Due to its broad impact, there is increasing interest in identifying the factors that influence academic research performance [12]. Reflective practice in higher education has also been shown to enhance students' academic performance, self-awareness, decision-making, and problem-solving. Structured reflective writing supports deeper engagement with learning and promotes lifelong learning and professional growth [13]. Despite the importance of research in advanced education, many graduate students perceive thesis and dissertation writing as stressful and burdensome due to high academic demands and various personal or institutional challenges. While many are motivated by academic goals, negative attitudes and anxiety often hinder their full engagement in research [14].

Research show that research support systems are essential for enhancing postgraduate students' research competence. Training programs tailored to students' needs, combined with strong student-supervisor interaction, help improve their research preparation [15]. Key skills like critical thinking and academic writing are foundational to research success and should be developed through regular practice [16]. Additionally, a strong institutional research culture further supports students by promoting high research performance and continuous learning [17].

2. METHOD

2.1. Research design

This study employs a quantitative analysis to evaluate the research competence and readiness of graduate students. The research was conducted in Laguna State Polytechnic University. The analysis uses the

mean to assess graduate students' research competence in terms of research knowledge, skills, and attitude. It also examines their level of readiness across different research phases: conceptual, design and planning, empirical, analytical, and dissemination phases. To determine the significant correlation between research competence and readiness to conduct research, the Spearman Rank Correlation is applied. Additionally, the Mann-Whitney U test is used to identify any significant differences in research competence and readiness levels when students are grouped by their degree programs. This design allows the researcher to systematically assess patterns and relationships across a sample size.

2.2. Research participants

The study involved 224 graduate students enrolled in the master of arts in education (MAEd), doctor of philosophy, and doctor of education, during the academic year 2022–2023. The sample comprised 78 students from the doctor of philosophy and doctor of education programs and 146 students from the MAEd program, covering various majors. A non-random sampling technique was employed, specifically purposive sampling, wherein participants were selected based on their completion of a research subject. This approach was chosen to ensure that the sample consisted of individuals with relevant experience in research activities, aligning with the study's objectives. The adequacy of the sample size was determined based on methodological guidelines for non-probability sampling in educational research particularly purposive sampling, this is appropriate when the research aims to gain insights from a specific subgroup possessing particular characteristics pertinent to the study. While statistical generalizability is limited in non-probability sampling, the depth and relevance of information obtained from a well-defined group can provide valuable insights into the research problem [18]. Therefore, the selected sample size was deemed sufficient to explore the research questions effectively.

2.3. The research instrument

The survey questionnaires were self-constructed and consisted of two main parts focusing on the respondents' research competence and readiness. A 5-point Likert scale was used to measure responses, where participants rated their level of preparedness from 1 (not ready) to 5 (highly ready). The scale used was: 5 (highly ready), 4 (ready), 3 (moderately ready), 2 (slightly ready), and 1 (not ready). The following scale ranges were used for interpretation: 4.20–5.00 (very high), 3.40–4.19 (high), 2.60–3.39 (moderately high), 1.80–2.59 (low), and 1.00–1.79 (very low).

To ensure reliability, the questionnaire was pilot tested on graduate students with similar profiles to the actual respondents but who were not part of the main study. Internal consistency was assessed using Cronbach's alpha, with results ranging from 0.808 to 0.868, indicating good reliability. These values suggest that the items within each subscale consistently measured the intended constructs related to research competence and readiness.

3. RESULTS AND DISCUSSION

3.1. Graduate students' research knowledge

Table 1 presents graduate students' assessment of their research knowledge. Doctorate students reported a higher level of proficiency (M=4.26) compared to MAEd students (M=4.14), indicating greater competence in viewing research from multiple perspectives, selecting appropriate references, applying statistical tools, and understanding practical implications. In contrast, while MAEd students can identify research objectives, they require further development in using appropriate tools and integrating practical insights into their work.

Building on previous findings showing that doctoral students typically demonstrate more advanced research knowledge, while master's students often encounter challenges in sampling, research design, and data collection, especially in quantitative research [19]. This emphasizes the importance of cultivating strong research knowledge as a foundational attribute for graduate students. Mastery of methodological skills and information literacy is crucial not only for academic success but also for the effective execution of research tasks [20], [21].

3.2. Graduate students' research skills

Table 2 shows graduate students' self-evaluation of their research skills. Doctoral students demonstrated very high level of research skill (M=4.22), reflecting strong abilities in analyzing problems from multiple perspectives, applying appropriate methodologies, and producing high-quality research outputs. This indicates that doctoral programs are effective in developing advanced research competencies. In contrast, MAEd students reported a high level of research skill (M=4.16), suggesting a solid foundation but with areas needing further development. The difference in ratings may reflect the depth and rigor of research training embedded in doctoral programs.

Table 1. Graduate students' research knowledge

No	Research knowledge	Doctorate students		MAEd students	
		M	Verbal interpretation	M	Verbal interpretation
1	The use of research databases	4.29	Very high	4.14	High
2	Evaluating critically found information as to accuracy and timeliness	4.26	Very high	4.17	High
3	Reading, reviewing and summarizing critically the contents of the literature	4.34	Very high	4.21	Very high
4	Identifying and applying relevant theories	4.29	Very high	4.21	Very high
5	Writing the statement of the problem/research objectives/hypotheses	4.40	Very high	4.26	Very high
6	Developing the conceptual model based on reviewed relevant theories	4.17	High	4.15	High
7	Determining the subjects and draw participants	4.35	Very high	4.27	Very high
8	Choosing the right research methodology	4.26	Very high	4.12	High
9	Using the appropriate statistical tools	4.05	High	3.98	High
10	Analyzing statistical results and write practical implications	4.04	High	3.97	High
11	Drawing conclusions based on the findings of the study	4.41	Very high	4.19	High
12	Using the suitable academic referencing style	4.28	Very high	4.13	High
13	Complying with the requirements in the publication of the research outcomes	4.26	Very high	4.10	High
	Overall mean	4.26	Very high	4.14	High

Table 2. Graduate students' research skills

No	Research skill	Doctorate students		MAEd students	
		M	Verbal interpretation	M	Verbal interpretation
1	Gathering and sorting information	4.36	Very high	4.22	Very high
2	Writing the background of the study coherently	4.30	Very high	4.18	High
3	Articulating concisely the research problem	4.20	Very high	4.14	High
4	Organizing and summarizing literature reviewed	4.24	Very high	4.16	High
5	Identifying relevant theories for the current study	4.28	Very high	4.18	High
6	Developing correctly a conceptual model	4.13	High	4.16	High
7	Choosing the appropriate research design	4.14	High	4.18	High
8	Applying knowledge of research methodology, particularly the data gathering procedure	4.25	Very high	4.18	High
9	Developing and establishing the reliability of the research instrument to be used	4.21	Very high	4.17	High
10	Identifying the fitting statistical tools for the research questions	4.00	High	4.00	High
11	Collecting data and analyzing and interpreting statistical results	4.18	High	4.14	High
12	Identifying the major findings and draw conclusions from them	4.27	Very high	4.16	High
13	Citing sources in appropriate style	4.24	Very high	4.13	High
14	Following the rules in academic writing	4.31	Very high	4.18	High
15	Writing the abstract of the study	4.31	Very high	4.18	High
16	Preparing a research outcomes in publishable format	4.14	High	4.18	High
	Overall mean	4.22	Very high	4.16	High

These results align with previous findings that doctoral students typically demonstrate stronger performance in key areas such as literature review, research design, data analysis, and independent inquiry. Doctoral education also reinforces essential competencies such as critical thinking, communication, and academic writing skills necessary for conducting innovative and high-impact research [22]. Meanwhile, the challenges commonly faced by graduate students particularly at the master's level such as difficulties with academic language, topic selection, time management, and methodological understanding, may contribute to the observed gap in research skills [23]. Addressing these issues through targeted skill-building programs could help bridge this divide and strengthen students' overall research capability.

3.3. Graduate students' research attitude

Table 3 indicates the perception of graduate students' research attitude. Doctorate students show a very high level of research attitude (M=4.36), while MAEd students reported a high level (M=4.22). These results suggest that both groups demonstrate positive dispositions toward research, with doctorate students showing slightly more favorable attitudes overall. The findings emphasized that doctorate students exhibit strong characteristics such as humility, openness to learning, and intellectual curiosity, which are essential for conducting quality research. Their higher mean scores may reflect the influence of doctoral programs that foster critical thinking, ongoing self-reflection, and a supportive academic environment. MAEd students also indicates a positive attitude toward research, reflecting that their programs promote a learning mindset. However, there is still room to further cultivate research enthusiasm and persistence, especially in preparation for more rigorous research tasks

These findings suggest that master of education students, despite experiencing research-related anxiety, often value research and maintain a positive outlook toward it [24]. Similarly, doctoral students'

positive attitudes have been associated with their methodological competence, problem-solving abilities, access to resources, and the presence of a strong research support system [25]. Such factors likely contribute to the higher level of research attitude observed among doctoral students.

Table 3. Graduate students' research attitude

No	Research attitude	Doctorate students		MAEd students	
		M	Verbal interpretation	M	Verbal interpretation
1	Conducting scholarly research helps build my professional competence	4.62	Highly positive	4.37	Highly positive
2	Conducting scholarly research is useful and relevant to my profession	4.65	Highly positive	4.41	Highly positive
3	Conducting scholarly research helps build my confidence and commitment	4.69	Highly positive	4.38	Highly positive
4	Conducting scholarly research is relaxing and simple	4.21	Highly positive	4.10	Positive
5	Conducting scholarly research keeps me engaged into a more systematic examination of issues in education	4.50	Highly positive	4.39	Highly positive
6	Conducting scholarly research encourages me to employ critical and analytical thinking	4.54	Highly positive	4.43	Highly positive
7	I can write the background of the study effortlessly	4.21	Highly positive	4.10	Positive
8	Writing the research objectives/statement of the problem/hypotheses is easy	4.21	Highly positive	4.12	Positive
9	I can undoubtedly choose the correct research design for my study	4.21	Highly positive	4.17	Positive
10	I feel confident at dealing with statistical tools for my study	4.21	Highly positive	4.10	Positive
11	I am highly prepared to conduct scholarly research	4.23	Highly positive	4.12	Positive
12	I possess sufficient research knowledge and skills	4.23	Highly positive	4.18	Positive
13	I can easily communicate my research findings	4.28	Highly positive	4.14	Positive
14	I can clearly search for reputable journals where to publish my completed research	4.21	Highly positive	4.12	Positive
	Overall mean	4.36	Highly positive	4.22	Highly positive

3.4. Graduate students' research readiness

Table 4 reveals the graduate students' responses of their research readiness across five phases of research process. Doctoral students consistently rated themselves as highly ready across all phases, suggesting that their programs more effectively cultivate advanced research competencies. For instance, in the conceptual phase, doctorate students reported a mean of 4.23, compared to 4.14 for MAEd students. This trend persists in the design and planning (doctorate: M=4.37; MAEd: M=4.16), empirical (doctorate: M=4.32; MAEd: M=4.18), and analytical phases (doctorate: M=4.32; MAEd: M=4.17), underscoring a consistent advantage among doctoral students in terms of preparedness for scholarly work [26].

Studies have shown that students, particularly at the master's level, often encounter obstacles such as time limitations, inadequate methodological training, lack of mentorship, financial constraints, and conflicting responsibilities, all of which may impede research readiness [27]. Key strategies that enhance student outcomes include effective supervision and self-directed learning, both of which contribute to increased research self-efficacy [28]. Furthermore, specific mentoring practices such as building trust, offering consistent feedback, integrating writing into coursework, and exposing students to diverse writing models have been found to significantly support academic writing development and timely degree completion [29]. Despite many graduate students possessing strong communication and problem-solving skills, challenges related to topic development, data analysis, and supervisory relationships persist, particularly when institutional support is limited [30], [31]. To address these issues, institutions must implement targeted interventions that build research capacity, strengthen supervision systems, and reduce the barriers that hinder students from progressing in their research.

3.5. Relationship on graduate students' research competence and research readiness

Table 5 reveals a significant positive relationship between graduate students' research competence and their research readiness ($p<0.01$). Competence in terms of knowledge, skills, and attitude is closely associated with students' preparedness across various research phases. This suggests that a student's research attitude and capability play a role in their readiness to engage in scholarly dissemination, including publication in refereed journals.

These findings underscore the importance of effective mentoring and supervision, which have been linked to increased research self-efficacy particularly in successfully completing major research projects such as doctoral theses [32]. However, research anxiety remains a common barrier, with high-achieving students often experiencing difficulties related to unfamiliar methodologies, fear of failure, publication pressure, and impostor syndrome [33]. Therefore, building students' research competence through structured mentorship, targeted training, and supportive environments can enhance both readiness and confidence, while also reducing anxiety-related obstacles that hinder academic productivity.

Table 4. Graduate students' research readiness

No	Research readiness	Doctorate students		MAEd students	
		M	Verbal interpretation	M	Verbal interpretation
Conceptual phase					
1	Undertake an advanced independent study	4.21	Highly ready	4.15	Ready
2	Pursue specialized and original questions	4.26	Highly ready	4.18	Ready
3	Plan research and explain its purpose	4.30	Highly ready	4.14	Ready
4	Identify relevant previously published research	4.21	Highly ready	4.11	Ready
5	Develop correctly a conceptual model	4.21	Highly ready	4.12	Ready
6	Build on a pattern for literature using the conceptual model	4.22	Highly ready	4.12	Ready
	Overall mean	4.23	Highly ready	4.14	Ready
Design and planning phase					
7	Determine the sample to be used	4.36	Highly ready	4.16	Ready
8	Apply my knowledge and skills in research methodology	4.38	Highly ready	4.17	Ready
9	Establish the reliability of the research instrument(s) to be used	4.36	Highly ready	4.17	Ready
	Overall mean	4.37	Highly ready	4.16	Ready
Empirical phase					
10	Choose the appropriate method in collecting data	4.39	Highly ready	4.18	Ready
11	Identify the appropriate statistical tools	4.27	Highly ready	4.16	Ready
12	Prepare gathered data for statistical analysis	4.29	Highly ready	4.19	Ready
	Overall mean	4.32	Highly ready	4.18	Ready
Analytical phase					
13	Employ quantitative/qualitative analysis skill	4.31	Highly ready	4.16	Ready
14	Interpret statistical results using analytical and logical reasoning	4.23	Highly ready	4.19	Ready
15	Draw valid conclusions from the results	4.40	Highly ready	4.15	Ready
16	Advance fitting recommendations based on the results	4.33	Highly ready	4.18	Ready
	Overall mean	4.32	Highly ready	4.17	Ready
Dissemination phase					
17	Prepare a final copy in publishable format following the rudiments of academic writing	4.27	Highly ready	4.18	Ready
18	Publish/communicate the research outcomes	4.31	Highly ready	4.18	Ready
	Overall mean	4.29	Highly ready	4.18	Ready

Table 5. Relationship on graduate students' research competence and research readiness

Readiness in the different phases	Knowledge		Skills		Attitude	
	r	*p*	*R*	*p*	*r*	*p*
Conceptual	0.631*	0.000	0.658*	0.000	0.590*	0.000
Design and planning	0.530*	0.000	0.625*	0.000	0.508*	0.000
Empirical	0.595*	0.000	0.606*	0.000	0.474*	0.000
Analytical	0.620*	0.000	0.639*	0.000	0.487*	0.000
Dissemination	0.500*	0.000	0.600*	0.000	0.481*	0.000

Note: $p<0.05$ is significant. The strength of r as 0.02=very weak; 0.2-0.4=weak; 0.4-0.6=moderate; 0.6-0.8=strong; 0.8-1=very strong.

3.6. Difference on the graduate students' research competence and readiness based on degree program

Table 6 presents the test of difference on graduate students' research competence and readiness based on their degree program. The results reveal that there is no significant difference in research competence across degree programs ($p>0.05$), indicating that graduate students, regardless of their degree track, assess themselves similarly in terms of research knowledge, skills, and attitudes. This finding aligns with a related study which found that research competence levels do not significantly differ between students in thesis-based and non-thesis program formats, suggesting that competence can be cultivated across varied program structures within the same academic level [34]. This supports the notion that program format may not inherently affect the development of research competencies when appropriate training and academic support are provided.

Table 6. Difference on the graduate students' research competence and readiness based on degree program

Variables	U-value	p-value	Analysis
Knowledge	4860	0.072	Not significant
Skill	5314.5	0.412	Not significant
Attitude	4800	0.536	Not significant
Readiness	4327.5	0.003	Significant

Conversely, a significant difference was found in research readiness based on degree program. This outcome is supported by another study, which emphasized that research readiness particularly in terms of technical preparedness, varies significantly by school affiliation. Such findings underscore that while competence may be evenly distributed, readiness can differ due to institutional factors, program focus, or access to resources. In this context, the significant difference in readiness reflects the varying levels of exposure and preparation that students receive across programs, even though they may eventually become research ready through institutional support and individual initiative [35].

4. CONCLUSION

The findings confirm a strong positive relationship between graduate students' research competence and their readiness to undertake the research process. Higher levels of competence were associated with greater research preparedness. Although no significant differences in research competence were found between academic programs, variations in research readiness were observed. This suggests the need for program-specific support strategies to address differing levels of readiness among students.

For recommendations, institutions should implement differentiated support strategies, such as program-specific mentoring, skills-based workshops, and structured research training aligned with students' academic progress. Faculty and administrators are encouraged to assess readiness indicators early and offer responsive interventions to bridge gaps. Given the limitations of self-reported data and purposive sampling, future studies should employ mixed-methods designs to triangulate findings and improve validity. Further exploration of cognitive and non-cognitive factors—such as technical proficiency, time management, and self-regulation—may offer deeper insights into the development of effective research competence among graduate students.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Authors state no conflict of interest.

INFORMED CONSENT

All participants provided informed consent prior to their involvement in the study.

ETHICAL APPROVAL

This study complied with ethical standards and received approval from the Research Ethics Committee of the first author's institution (REC Code: 2024-098).

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author, [MASG], upon reasonable request.

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