

International Journal of Learning, Teaching and Educational Research
 Vol. 25, No. 7, pp. 598-623, July 2026
<https://doi.org/10.26803/ijlter.25.7.27>
 Received May 2, 2026; Revised Jun 24, 2026; Accepted Jun 25, 2026

Effect of Extension-Based Capacity-Building Intervention on Academic Writing Proficiency in Research Discourse Among Emerging Researchers: A Pre-Experimental Study

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Abstract. This research determined the effect of an extension-based capacity development on academic writing proficiency in research discourse as a learning intervention in enhancing the research writing skills and outputs of the 72 emerging researchers purposefully sampled based on their research competence. Upon examination of research interests and learning strands, the emerging researchers formed 12 groups with 6 members in each group to display collaborative research writing as an inherent feature of the intervention. The study utilized a pre-experimental design, particularly one-group pretest-post-test design and was also supported by qualitative insights from semi-structured interviews and extracted research outputs for triangulation. A content-validated and reliability-tested questionnaire was utilized focused on four research writing domains to describe the academic writing competencies of the respondents, while a four-criterion rubric was employed to describe the level of quality of their research outputs. Consequently, the participants demonstrated a substantial improvement across all areas of academic research writing, as evident in the significant results with p-values ranging from 0.01 to 0.04, reflecting the effectiveness of the intervention's structure, inherent features, and delivery. The emerging researchers initially struggled in writing literature review-based research gap analysis and significance of the study, including results' discussion and study's implications. Nevertheless, the integration of lectures, hands-on activities, and mentoring as features of the extension-based capacity development provided a comprehensive learning experience for research writing competencies improvement, thus making it a viable educational platform that strengthens academic rigor of research writing and scholarly outputs.

Keywords: capacity-building intervention; academic writing proficiency; research discourse; pre-experimental research design; university extension program

Citation:
 Raymundo, J. L. (2026). Effect of Extension-Based Capacity-Building Intervention on Academic Writing Proficiency in Research Discourse Among Emerging Researchers: A Pre-Experimental Study. *International Journal of Learning, Teaching and Educational Research*, 25(7), 598–623. <https://doi.org/10.26803/ijlter.25.7.27>

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1. Introduction

Writing research papers in an academic setting has always been accompanied by intensive educational preparation, such as extensive writing skills acquisition and problem-solving competencies in an inquiry-focused learning environment. Educational stakeholders, especially the teachers and the students, are increasingly expected to contribute to research-informed practices, yet many face challenges in producing scholarly outputs owing to limited training, experience, and institutional support (Nakijoba & Ayodeji, 2022). As the demand for evidence-based approaches intensifies, so too does the urgency to empower stakeholders with the skills and competencies necessary for rigorous academic writing in research discourse.

Essentially, extension programs in higher education institutions have long served as vital conduits between academic expertise and the practical needs of communities, particularly in the field of education (De Souza & Kochhann, 2023; Oliveira et al., 2024). Essentially, educational stakeholders can help societal transformation through service-learning initiatives to address learning challenges further (Raymundo, 2026). These programs aim to extend the reach of universities beyond traditional classroom instruction by providing meaningful engagement with the public. Designed to promote not just the dissemination of theoretical knowledge but also the application of practical skills, extension programs respond to real-world problems through inclusive, context-sensitive interventions. In the education sector, these initiatives often take the form of workshops, training sessions, consultations, coaching or mentorships for the engagement and empowerment of both faculty and non-academic stakeholders, such as teachers, school heads, and students (Angco, 2026; Cummings et al., 2015; Reston & Poliquit, 2020).

In leveraging the institutional strengths of higher education, such as access to expert faculty and evidence-based methodologies, extension-based capacity development initiatives can address community needs effectively (Llenares & Deocarís, 2018) and contribute to the advancement of academic competencies among educational stakeholders. Among the most complex academic skills that learners acquire in a learning environment is academic writing in research discourse, as it weaves together multifaceted dimensions of writing proficiency and research competencies. In fact, the focus on academic writing proficiency in research discourse is crucial, as it remains a skillset that many stakeholders, specifically among the students and teachers, find challenging owing to its technical nature and the lack of sustained support or training opportunities in many educational contexts (Agudo & Garcia, 2025; Harshalatha & Yadamala, 2024). These competencies include, but are not limited to, technical writing, research design, data analysis, and scholarly presentation.

It is aggravated by the fact that, despite its importance, many stakeholders also lack confidence in research writing, leading to limited quality outputs and underutilization of research in educational decision-making (Paramboor et al., 2025). Minimal exposure to formal research methodologies before training may result in descriptive and shallow research outputs (Cagaanan & Gosadan, 2018).

Hence, this underscores the need for targeted capacity-building interventions that specifically address gaps in research, writing, knowledge and practice. There is also a notable lack of available studies that investigate explicitly the effects of extension-based capacity development on the research writing competencies of educational stakeholders (Silva & Martínez, 2025), which justified the conducting of this research. It has the primary objective of determining the effect of extension-based capacity-building intervention on academic writing proficiency in research discourse of emerging researchers.

Moreover, this study is pivotal since it evaluates the effects of the extension-based capacity development program of the university. Considering the vast literature on the identified research topic, there is a dearth of related studies on the evaluation of the effects of extension programs despite the availability of HEI community engagement practice (Gillespie & Mitchell, 2019; Llenares & Deocarís, 2018; Workman & Scheer, 2012). To address this research gap, this study provides insights into higher education institutions on the direction and proper implementation of their various extension programs and their effectiveness in helping and uplifting the lives of their target beneficiaries.

Such evaluation serves as a mechanism for continuous improvement, as the findings provide valuable feedback on the strengths and limitations of the extension initiatives, thereby guiding the refinement of training content, delivery strategies, and support systems (Putra, 2024; Retnowati, 2024). Moreover, evaluation generates empirical evidence that supports evidence-based decision-making in designing new programs and scaling up successful approaches, ensuring that stakeholders gain competencies that are relevant and sustainable (Belita et al., 2020; Partahian et al., 2024; Simpson et al., 2020).

Furthermore, the findings can inform the possible design of sustainable research development programs, which could be implemented to empower stakeholders to become more competent researchers and could strengthen the culture of research in educational institutions. Hence, this research could contribute to the production of empirical data on the effects of extension-based activities in developing the academic writing competencies of emerging researchers, which could provide actionable insights for educational leaders, policymakers, and academic institutions committed to cultivating research-literate practitioners in education.

Ultimately, the study has contributed to addressing the broader Sustainable Development Goals (SDGs) of achieving quality education (SDG 4) and partnership for the goals (SDG 17) through the improvement of learning outcomes and the skills of the students by means of collaboration between institutions in the delivery of extension-based capacity development as learning intervention.

1.1 Research Questions

This study sought to answer the following research questions:

1. What is the level of academic writing proficiency in research discourse of the respondents before and after the extension-based capacity-building intervention?
2. What is the quality level of research outputs of the respondents before and after the extension-based capacity development on academic writing proficiency in research discourse?
3. Is there a significant difference in the academic writing proficiency in research discourse and research output quality before and after the intervention?

2. Literature Review

The effectiveness of capacity development as intervention to improve academic skills, such as research discourse writing, is deeply rooted in learning theories as theoretical foundations, specifically Vygotsky's Zone of Proximal Development (ZPD). This theory emphasizes that individuals learn best through collaboration with more skilled people or capable adults and peer facilitation framed in scaffolded interventions (Shabani et al., 2010). This is reinforced further by the notion of Wood et al. (1976) of scaffolding as a cognitive support given by an expert tutor to support learners' progress and achievement through a difficult learning task (Fernández et al., 2015). In this study, academic writing in research discourse is considered a difficult learning task for emerging researchers, who can be helped through a scaffolded intervention or, in this case, the implemented capacity development.

Relating it to community engagement initiatives as scaffolding platforms, Angco (2026) proposed the transformative community empowerment theory (TCET) based on complementary theoretical frameworks on community development, such as empowerment theory, community development frameworks, and capability approach. He contextualized these theoretical underpinnings in the Philippine HEI community engagement milieu, postulating that effective implementation of extension programs hinges on five interdependent pillars, such as economic empowerment and livelihood enhancement, social inclusion and community engagement, skills development and capacity-building, leadership and empowerment, and sustainability and long-term impact. Thus, the effectiveness and sustainability of community engagement initiatives lie in community responsiveness and the approach of stakeholders towards community empowerment, and not solely on funding and sponsorship (Llenares & Deocarís, 2018).

2.1 Use of Capacity Development as Intervention to Improve Academic Writing Proficiency in Research Discourse

Several studies focus on the beneficial effects of structured training on enhancing academic writing competencies in research discourse, particularly for students and early-career researchers. For instance, Pulford et al. (2020) demonstrated that participants in a research writing workshop exhibited significant advancements in formulating research questions, study design, and data interpretation. Likewise, Dako-Gyeke et al. (2020) revealed substantial improvements in

participants' understanding of research methodologies, academic writing, and confidence in conducting independent research after capacity development. Also, Yuan et al. (2020) underscored significant enhancement in articulating research objectives, conducting literature reviews, and applying suitable methodologies following structured training among research participants, thereby enhancing the quality and clarity of their research outputs. In addition, Maxwell (2024) indicated that capacity development programs significantly enhanced students' abilities to engage critically with research literature and apply theoretical frameworks, as evident in their marked improvements in academic writing proficiency in research, particularly in formulating hypotheses and selecting methodologies.

The aforementioned studies accentuated the positive post-assessment results of capacity development as effective scaffolding support to emerging researchers who lack learning exposure and/or structured guidance. Most of these interventions invest in the academic writing skills of the students, leading to section-by-section improvement of research papers as tangible output. Other capacity development focused on related factors of academic writing in research discourse, such as critical engagement with academic literature to bridge theoretical knowledge and practical application in research writing (Pangket et al., 2023), and increased confidence in research findings presentations as an indicator of research competence enhancement (Indah et al., 2022) to underline how research writing skills are generally acquired in relation to cognitive-related skills.

Other targeted research writing-focused interventions did not only focus on basic and core academic writing competencies in research discourse but also considered the subsequent academic phases after research writing skills acquisition. Murphy et al. (2023) reported remarkable advancements, with several participants successfully submitting papers to peer-reviewed journals post-training, while Juckett et al. (2022) claimed that those who received ongoing mentorship and training not only improved their technical writing but also cultivated a research-oriented mindset. Thus, this implies that capacity development programs should also encompass the publication of research outputs, to build appreciation and a favorable mindset regarding what research brings to the academic community.

Some research highlighted the features of effective research writing-oriented capacity development programs, such as the pivotal role of the program's interactive training elements, for example, workshops, mentoring, and peer reviews, in achieving favorable outcomes (Alsalim et al., 2024) and the implementation of a mix of training and experiential and interdisciplinary service-learning activities (Reston & Poliquit, 2020). These studies collectively emphasize the importance of well-structured training interventions in equipping individuals with the requisite and related skills for effective research writing, leading to more concrete outcomes such as publication and cultivating a positive research-oriented mindset. Nevertheless, most of the capacity-building activities on academic research writing are interventions in formal and structured academic settings, not contextualized as a community engagement initiative addressing needs related to academic writing proficiency in research discourse.

2.2 Use of Capacity Development as Intervention to Improve Level of Research Output Quality

Capacity-building activities directed at improving research outputs vary in focus. Some service-learning trainings or workshops implemented enhanced the academic structure of research outputs (Wong & Uy, 2015), such as citation practices and a deeper engagement with academic literature, coherence of structured arguments, data interpretation, and conclusions (Adebisi, 2022; Cavens, 2019; Mzini, 2023; Sombié et al., 2021), and scientific merit and writing style (Chambers, 2020).

Other studies emphasized improvement of research outputs in terms of the establishment of ethical standards (De Asis et al., 2023; Mzini, 2023). Nowadays, research outputs are not only evaluated as to their significant contribution to bodies of knowledge, logic of research framework, and flawless technical writing structure, but methodological rigor is also a critical angle of research assessment. Hence, this explains why some capacity development programs gave prominence to the ethical dimension of the research outputs of participants, which highlight scientific integrity, as well as the suitability of research tools and methodological alignment (Ganann et al., 2019).

Alternatively, other research-focused community engagements underscored the essence of continuous feedback, peer review, and mentoring to improve and sustain the quality and robustness of the participants' research outputs (Adebisi, 2022; Suleiman et al., 2017; Wong & Uy, 2015). Consequently, Agatep and Villalobos (2020) revealed that capacity development programs are not just scaffolding tools to enhance the clarity and coherence of research outputs, as well as methodological rigor and alignment, but also a powerful platform to increase submissions and acceptances by reputable journals (Agatep & Villalobos, 2020) and to advance research competence in general (De Asis et al., 2023).

Generally, the related studies emphasize that capacity-building activities are effective learning interventions assisting students to aim for research quality improvement in the academic structure and coherence of the research paper, and can be strengthened through consistent feedback, peer review, and mentoring to increase the number of publishable and quality research articles among training participants. However, every capacity-building activity targets a specific related quality of the research output indicators and is not broad enough to encompass all sections of a research paper, beginning with problem formulation and study significance, systematic literature review and theoretical framework development, interpretation and presentation of analyzed data, and research conclusion and reporting. In particular, this kind of section-by-section organization serves as both general and institutional formats in research article templates.

3. Methodology

3.1 Research Design

The study utilized a pre-experimental design, particularly one-group pretest-post-test design, since the emerging researchers' academic writing proficiency in research discourse was measured before (pretest) and after (post-test) the capacity-building intervention, which served as the treatment of the study. Moreover, triangulation was conducted for cross-corroboration of the quantitative data of the study through interview extracts and analysis of research outputs.

The study followed a pre-experimental design because this aligned with the setup and context of the study, particularly that only the identified beneficiaries or the clientele of an extension project or community engagement were capacitated and received the treatment or intervention. Nevertheless, considering the threats on internal validity of this research design, intervening variables such as maturation effect (natural improvement over a specific period of time), history effect (concurrent research activities at school), and the testing effect (subjectivity of the self-report data) were acknowledged during the duration of the treatment implementation.

3.2 Respondents of the Study

The teachers initially evaluated their students' performance in their subject Practical Research and the quality of the research outputs they initially submitted as the basis for determining the specific respondents of the study. Those groups of students who obtained a rating which did not meet expectations (below the grade of 75) were purposefully selected by their research teachers as emerging researchers who needed capacity development for enhancement. Also, those who gained a fairly satisfactory to satisfactory grade, ranging from 75-84 in the level of quality research drafts as tangible learning outputs manifesting their academic writing proficiency in research discourse.

Hence, a total of 72 students were considered respondents of the study across all academic strands. On the other hand, the group of students who obtained a very satisfactory to outstanding performance or rating in their initial research drafts was excluded from the extension-based capacity-building activities on academic writing proficiency in research discourse, as they were already expected to have developed and mastered the competencies needed in crafting scholarly and coherent research work.

In addition, the respondents were grouped according to their research interests, thus having 12 groups with six members each in research proposal making. The respondents were from the high school department of a private university in Santiago City, Isabela, which serves as a community partner of the researcher. Together with this, it was also acknowledged that since the research respondents were from a single institution, the generalizability of its findings is limited in its research setting, since each higher education institution is unique in its own research ecosystem.

3.3 Research Instrument

To obtain the necessary and relevant data needed for the study, a questionnaire was utilized to assess their perceived academic writing skills proficiency in research discourse of the emerging researchers. It consisted of 24 items, categorized in four domains: problem formulation and study significance, systematic literature review and theoretical framework development, interpretation and presentation of analyzed data, and research conclusion and reporting.

To calculate the Content Validity Index (CVI) of the research instrument, it was evaluated by three expert validators who are teaching research subjects in post-secondary and/or collegiate learning institutions and are proficient in academic writing in research discourse. Each expert evaluated the relevance of each indicator of the 24-item questionnaire for academic writing proficiency in research discourse using a four-point Likert scale. As a result, each item obtained an Item-Level CVI of 1.00 since all three experts consistently rated each indicator as either 3 (relevant) or 4 (highly relevant), thereby meeting the standard minimum threshold for exemplary content validity.

The validated instrument was further tested for its reliability, and obtained a computed Cronbach's alpha value of 0.86, indicating a high internal consistency reliability. Nevertheless, it was acknowledged that self-report questionnaires may be subject to social desirability bias. This was followed up by a semi-structured interview with teachers and respondents, and the critiquing of research proposals as initial student outputs as part of a needs assessment and to validate the quantitative data from the self-report questionnaire initially obtained in the study.

The researcher also used a four-criterion rubric focused on problem formulation and study significance, systematic literature review and theoretical framework, coherence and conceptual alignment, and critical insight and research contribution to assess the quality level of the research outputs submitted by the emerging researchers. Moreover, the rubric applied a three-point criterion level of performance with descriptions of excellent (5 points), satisfactory (3 points), and poor (1 point).

3.4 Data Gathering Procedure

The researcher asked permission first from the institution head for approval to conduct the study in the identified locale and sought consent of the respondents and their parents for their participation in the study and in the extension-based capacity development on academic writing proficiency in research discourse. They were also oriented on the nature and extent of their participation, assured of data protection and anonymity, and of the confidentiality of their responses. What follows are the specific strategies and methodologies of implementation of extension-based capacity development as learning intervention, which were vital in data collection. It spanned the specific processes conducted during the pre-implementation, implementation, and post-implementation phases of the data gathering procedure.

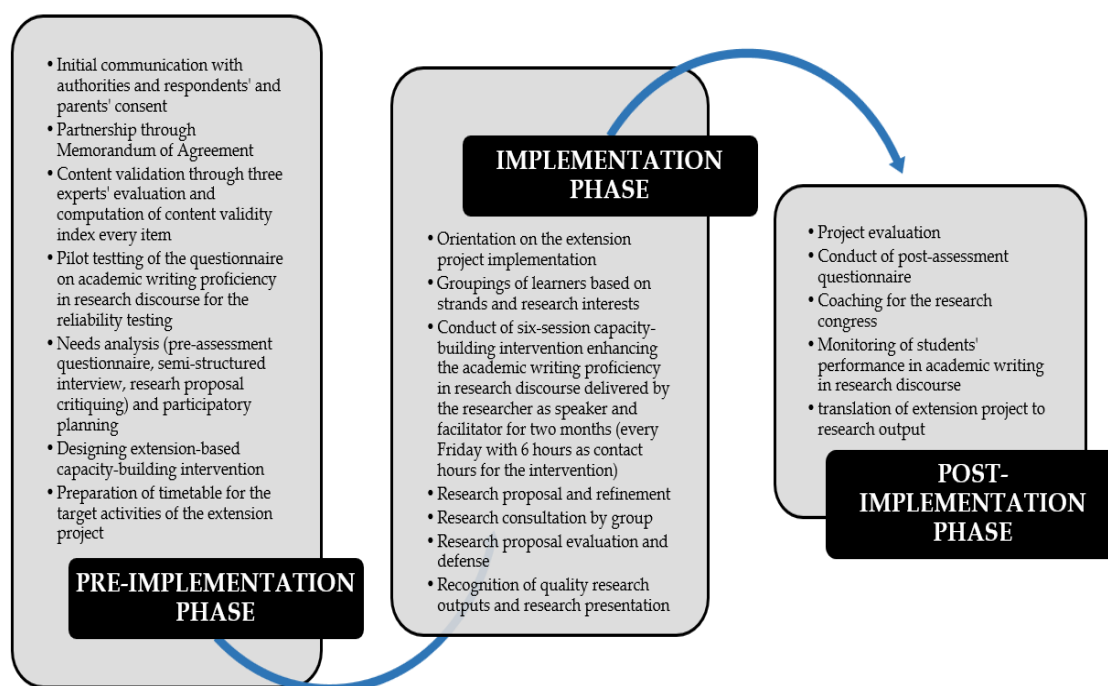


Figure 1: Strategies of implementation of the extension project on academic writing proficiency in research discourse enhancement

3.5 Design of the Research-focused Capacity-building Intervention on Academic Writing Proficiency

The six-session extension-based capacity-building intervention on academic writing proficiency consisted of the following learning content: writing research problem and background; five components of writing a good research introduction; social science deficiency model; research process and guidelines in formulating general and specific problems/questions; writing significance of the study; definition of terms, scope and delimitation of the study; review of related literature; reference searching; conceptual framework and paradigm; presentation of data through text, table, and graph; guidelines on data interpretation with research discourse; contents of a summary; drawing conclusions; identification of research limitations; and making recommendations.

Each session was delivered by the researcher as resource speaker, consultant, and facilitator every Friday from October to November 2024 on a whole-day basis or for six hours to ensure intensive and comprehensive training for the emerging researchers. While all aspects of academic research writing were included, greater emphasis was placed on the competencies such as research gap analysis, gathering and reviewing of literature, discussion of statistical findings, and drawing data-supported conclusions as least mastered by the participants, evident in the lowest mean reported, based on the analyzed data from the pre-assessment questionnaire before the implementation of the intervention.

3.6 Statistical Treatment of Data

Descriptive and inferential statistics were used to describe the quantitative analysis of the collected data, particularly frequency count and percentage, and

paired sample t-test for the level of academic writing proficiency in research discourse and level of quality of research outputs of the respondents before and after the capacity-building intervention, as well as Cohen's d to measure the magnitude of the effect of the intervention.

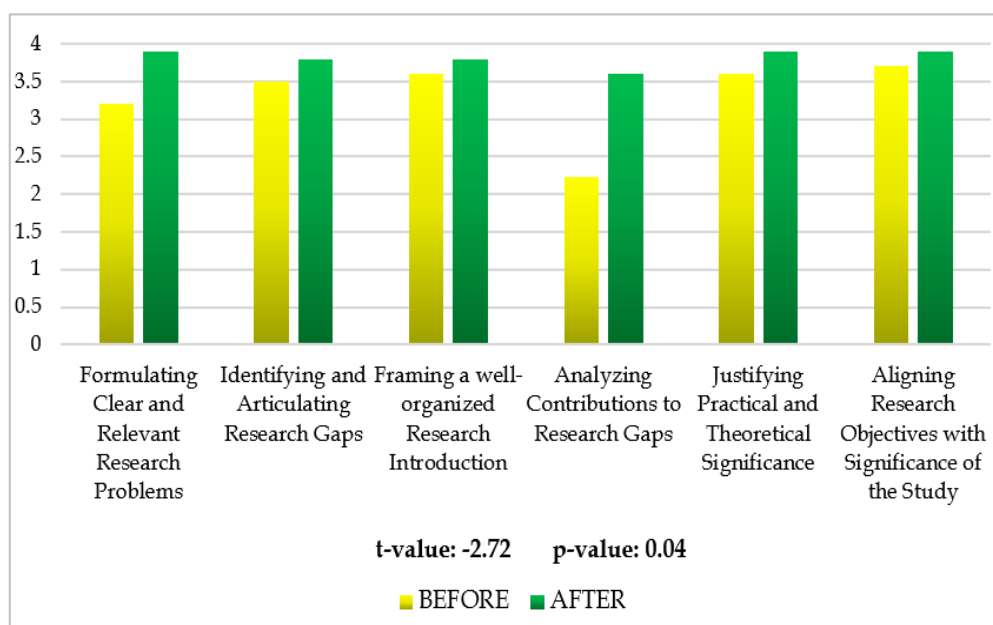
However, for the analysis of the qualitative data, cool and warm analysis (De Guzman & Tan, 2007) was used to identify significant and relevant statements from the interview transcriptions and from document analysis of actual samples of research outputs of the emerging researchers, which were subjected to inductive coding. To substantiate the data analysis and interpretation, the quantitative results from the self-report questionnaire were also triangulated using the qualitative data gathered through semi-structured interviews. As quantitative data, the rubric scores describing the quality level of the research output of the students were corroborated through document analysis of the actual sample research outputs.

4. Results

4.1 Level of Academic Writing Proficiency in Research Discourse Before and After the Extension-Based Capacity-Building Intervention

Table 2 shows the academic writing competencies in research discourse of the participants before and after the extension-based capacity-building intervention in terms of problem formulation and study significance. While the participants show competence in most of the indicators of research problem formulation, it is interesting to note that these participants are not competent in analyzing contributions to research gaps. Emphasizing research gap analysis to support the justification of the study is explicated in the following interview extract:

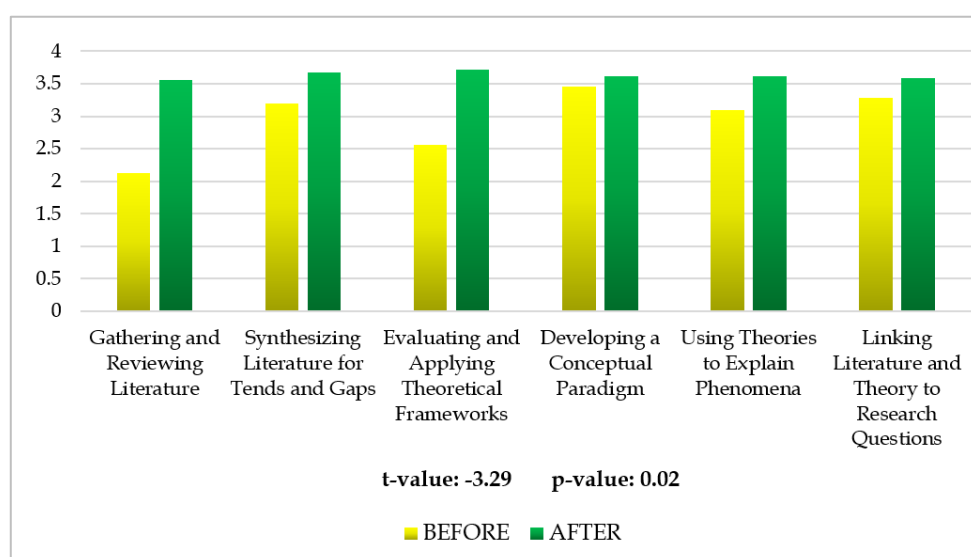
"Actually, nahhirapan pa rin ang mga students ko sa paggawa ng magandang introduction ng research kasi hindi nila naemphasize yung research gap. [Actually, my students find it hard to write a good research introduction because they could not emphasize the research gap of their study.] They do not know how to provide a clear gap as to why they have conducted the research." (Teacher Participant 3)



Scale: 1.00–1.74=Not Competent; 1.75–2.49=Less Competent; 2.50–3.24=Competent; 3.25–4.00=Highly Competent

Figure 2: Comparison (pre and post) of the competencies of the participants in problem formulation and study significance

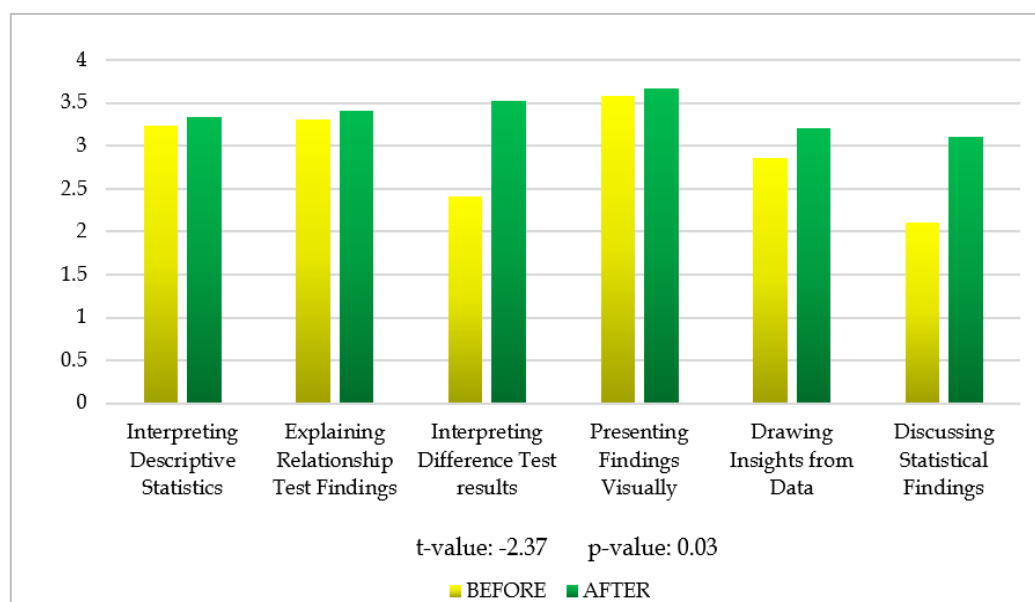
Figure 2 shows that the academic writing competencies in research discourse of the participants, particularly on research problem formulation and study significance, improved after the six training sessions. This improvement, as evidenced by the p-value of 0.02, is significant, which then implies that the capacity-building intervention was effective in enhancing the participants' proficiency in academic writing in research discourse, specifically on research problem formulation and articulation of the significance of a study.



Scale: 1.00–1.74=Not Competent; 1.75–2.49=Less Competent; 2.50–3.24=Competent; 3.25–4.00=Highly Competent

Figure 3: Comparison (pre and post) of the competencies of the participants in systematic literature review and theoretical framework development

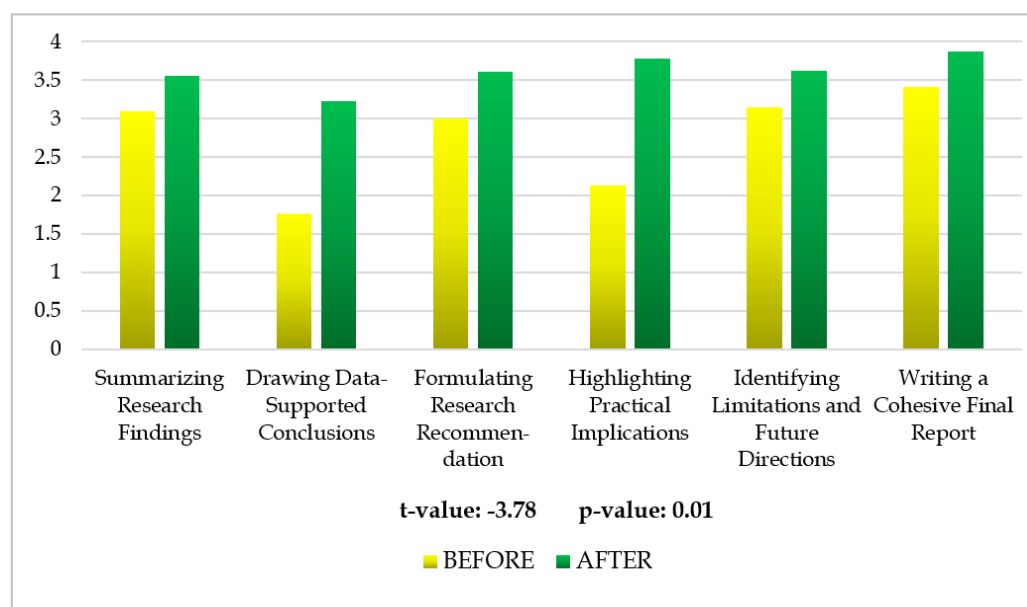
Meanwhile, Figure 3 provides the data on the level of competencies of the participants, particularly on systematic literature review and theoretical framework development, before and after the training sessions. As evidenced by the p-value of 0.02, the participants' competencies in this dimension of research writing improved, indicating that the training sessions effectively instilled in them the skills needed for systematic literature review writing. On the other hand, Figure 4 shows the participants' academic writing competencies in research discourse, particularly on the interpretation and presentation of analyzed data before and after the extension-based capacity-building intervention. The figure indicates a significant improvement in this area, as supported by a p-value of 0.03, confirming the effectiveness of the research writing-focused training sessions.



Scale: 1.00–1.74=Not Competent; 1.75–2.49=Less Competent; 2.50–3.24=Competent; 3.25–4.00=Highly Competent

Figure 4: Comparison (pre and post) of the competencies of the participants in interpretation and presentation of analyzed data

Figure 5 shows the participants' academic writing competencies in research discourse, particularly in writing research conclusions and reporting, before and after the extension-based capacity-building intervention. As the results show that emerging researchers feel incompetent in drawing data-supported conclusions and less competent in highlighting practical implications, they revealed that this aspect of academic writing in research discourse had not yet been discussed thoroughly by their research teacher.



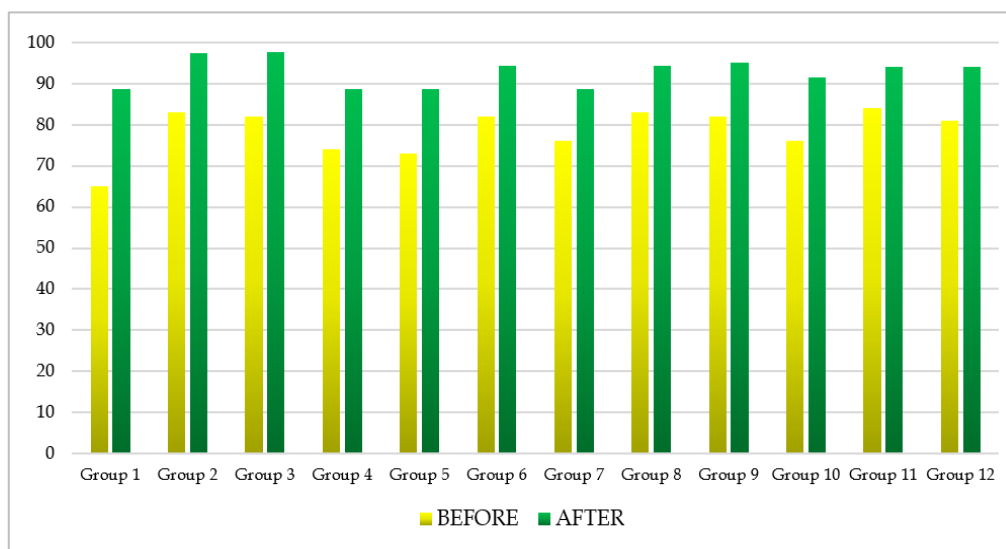
Scale: 1.00–1.74=Not Competent; 1.75–2.49=Less Competent; 2.50–3.24=Competent; 3.25–4.00=Highly Competent

Figure 5: Comparison (pre and post) of the competencies of the participants in research conclusion and reporting

The lack of technical depth in the discussion of research conclusions and reporting is a significant factor in the pre-assessment performance of the emerging researchers in terms of their academic writing proficiency in research discourse. Nevertheless, the figure indicates a significant improvement in this area, as supported by a p-value of 0.01, confirming the effectiveness of the research writing-focused training sessions.

4.2 Level of Quality of Research Outputs of the Respondents Before and After the Capacity Development on Academic Writing Proficiency in Research Discourse

Before the start of the training sessions, the participants were tasked with writing draft research proposals. The quality of their initial outputs was assessed using the following dimensions: problem formulation and study significance, systematic literature and theoretical framework, coherence and conceptual alignment, critical insight, and research contribution. Figure 6 presents a comparison of the quality of research outputs of the participants before and after the training sessions on academic writing proficiency in research discourse.



Scale: Fragmented=Below 75; Limited in Scope=75-79; Moderately Comprehensive=80-84; Substantially Comprehensive=85-89; Highly Comprehensive=90-100

Figure 6: Comparison of the quality of research outputs of the participants before and after the training sessions on academic writing proficiency in research discourse

Figure 6 shows that the majority of the respondents, specifically 42 or 58%, were able to produce a moderately comprehensive research proposal, while 18 or 25% submitted a fragmented research output. Moreover, 12 or 17% of the respondents turned in research work described as limited in scope. The following interview extracts highlight specific reasons for the initial rating or performance of the emerging researchers in creating quality research outputs, such as inadequate research problem justification through literature review-based gap analysis, and lack of strong rationale for the contribution of the study as weaknesses of the students:

“Nahihirapan ang mga bata sa pagjustify ng research problem [The students find it hard to justify their research problem]. They can describe the situation, the problem, but with the research gap that could emerge from searching related literature, hirap na sila [they were already having a hard time]. Also, in the significance of the study, they uniformly say it is beneficial without specifying how the beneficiaries benefit from their research. Tuloy hindi nila mailaban yong contribution ng research nila pag tinatanong mo sila. [Consequently, they could not defend their research contribution whenever you asked them].” (Teacher Participant 8)

These weaknesses are also shown in the following snapshot of their research paper:

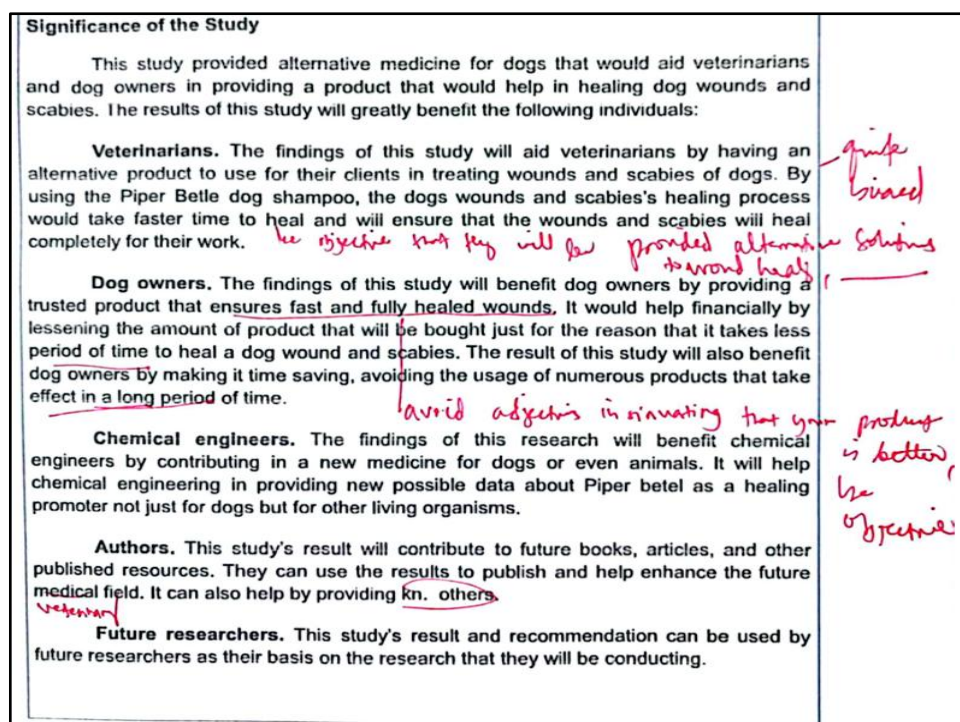


Figure 7: Sample snapshot of a research output (significance of the study)

The significance section failed to provide a compelling rationale for the research. Instead of showing clear contributions to the field, community, or educational system, they rely on vague claims such as “this will help students” or “this is important.” They lack theoretical, social, or academic justification to establish urgency or impact, weakening the persuasiveness of the proposals. In addition, the following snapshot shows objectives needing clarity and alignment:

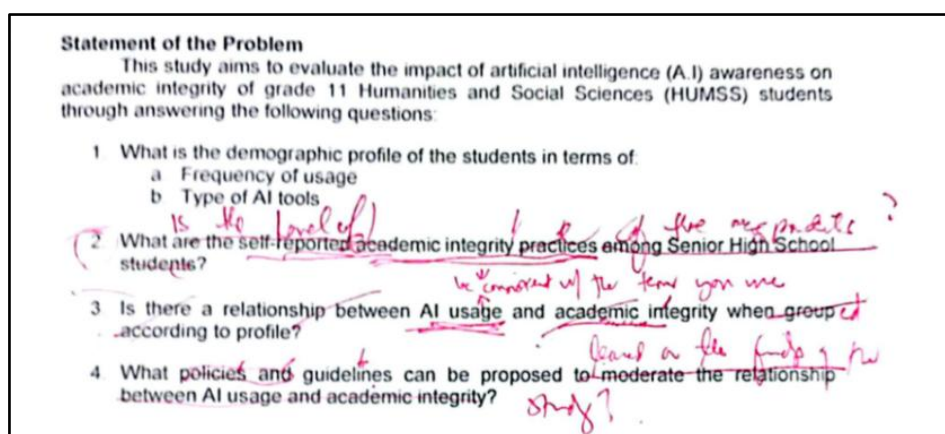


Figure 8: Sample snapshot of a research output (statement of the problem)

After the implementation of the extension-based capacity-building on academic writing proficiency in research discourse, the majority of emerging researchers,

totalling 48 or 67%, were able to write highly comprehensive research output, while 24 or 33% of them submitted substantially comprehensive research work. In fact, the emerging researchers and research teachers expressed their appreciation for the implemented capacity-building on academic writing proficiency in research discourse, as it really helped them in refining and calibrating their research skills and research outputs. They underscored particularly the meaningful learning session in a collaborative platform with peers and research experts as contributory factors to their research writing competency improvement, as explained in the following interview extracts:

“Through the meaningful experience and collaboration, I had with my groupmates, I enjoyed writing our research proposal, and I appreciated that we were given the chance to consult research experts to guide us in writing our proposal. It is one-of-a-kind experience!” (Student Participant 1)

4.3 Difference in Academic Writing Proficiency in Research Discourse and Research Output Quality Before and After Intervention

Table 1 shows the difference in the academic writing proficiency of the emerging researchers in research discourse before and after the extension-based capacity development, using Cohen's d analysis.

Table 1: Difference in the academic writing proficiency in research discourse before and after the training sessions

Academic writing competencies in research discourse	t-value	p-value	Cohen's d	Effect magnitude
1. Problem formulation and study significance	-2.72	0.04	0.32	Small-Moderate
2. Systematic literature review and theoretical framework development	-3.29	0.02	0.39	Small-Moderate
3. Interpretation and presentation of analyzed data	-2.37	0.03	0.28	Small
4. Research conclusion and reporting	-3.78	0.01	0.45	Moderate
Overall mean effect			0.36	Small-Medium

The results imply that the intervention had small-to-moderate practical effects as educational gains across all domains of academic writing proficiency in research discourse, showing that the emerging researchers benefited from the intervention. Specifically, the strongest effect of the intervention was observed in research conclusion and reporting, indicating the effectiveness of the extension-based capacity development in improving students' abilities to draw generalizations and implications of the study, as well as research limitations, based on the reported findings.

Table 2: Difference in the quality of research outputs before and after the training sessions

Average score on the research outputs		t-value	p-value	Cohen's d	Effect magnitude
Before	After				
78.42%	92.72%	-14.30	0.01*	4.13	Extremely large

N=12 (groups)

Overall, the average score of the participants before the six-session extension-based capacity-building intervention on academic writing proficiency in research discourse was at 78.42%, whereas their average score after the training sessions was at 92.72%, noting an improvement of at least 14.30%. This improvement in the quality of their research output is also significant, as evidenced by the p-value of 0.01, as shown in Table 2. Moreover, when the unit of analysis was based on the number of groups ($n=12$), Table 2 reveals that the intervention had an exceptionally large effect on the quality level of the group research outputs of the emerging researchers, thus suggesting that the impact of the intervention is practically profound.

5. Discussion

5.1 Level of Academic Writing Proficiency in Research Discourse Before and After the Extension-Based Capacity-Building Intervention

Before the implementation of the extension-based capacity development on academic writing proficiency in research discourse, the research participants were most challenged and thought they were less competent in making a sound research gap analysis to support the significance of the study. Students usually encounter difficulties in identifying research gaps and framing their studies (Maxwell, 2024) owing to the complexity of these research writing competencies, which are the backbone and bear the justification of the conduct of the investigation.

Essentially, literature review-supported gap analysis and research significance entail a high level of thinking or weighty cognitive demand when synthesizing research findings and subsequently connecting them to the research contribution. Effective problem formulation requires critical thinking, contextual understanding, and familiarity with current scholarly debates, competencies that many educators in secondary schools still struggle to develop owing to limited research training and institutional support (González-Laguna et al., 2024), while the significance section of scholarly work is often underdeveloped because novice researchers fail to establish the theoretical, practical, and policy implications of their studies (Mat et al., 2025).

However, the research participants initially thought they were highly competent in formulating clear and relevant research problems, identifying and articulating research gaps, framing a well-organized research introduction, justifying practical and theoretical significance, and aligning research objectives with significance of the study. They also maintained this level of research writing competence even after the implementation of the capacity development, although there was a

minimal increase of the computed mean in each academic writing competency. This implies only that once the justification of the study exists as a blueprint through a sound literature review-based research gap analysis. Significance, the other academic writing competency in research discourse, particularly on problem formulation and study significance, is easier to substantiate, given the blueprint of the research from which the details of the aforementioned competencies and research paper sections are anchored. As to the skills enhancement reported after the implementation of the intervention, studies have shown consistently that capacity-building programs, mentoring interventions, and structured research writing workshops improved participants' ability significantly to identify research gaps and formulate meaningful research questions that address educational concerns (González-Laguna et al., 2024).

In addition, the research participants found difficulty and were described as less competent in gathering and reviewing literature. Effective literature synthesis requires critical evaluation rather than simple summarization of previous studies (Zhang et al., 2023), making this research writing competency challenging to acquire (Alsalim et al., 2024; Ndagi et al., 2023). As literature review-supported research gap and significance pose difficulty among emerging researchers, so do content search of literature and related studies, since academic research writing is truly laden with the rigorous search of relevant and related literature and studies. This forms part of the primary stage of any research activity and would facilitate conceptual understanding of the research topic.

In contrast, the respondents were initially competent in synthesizing literature for trends and gaps, evaluating and applying theoretical frameworks, using theories to explain phenomena, and linking literature and theory to research questions. After the series of capacity-building interventions, they had become highly competent in all the competencies under systematic literature review and theoretical framework development. With this remarkable improvement, the intervention as a scaffolding support through research experts or tutors' guidance, particularly the integration of collaborative mentoring, scaffolded instruction, and guided literature analysis, had been shown to strengthen theoretical reasoning and conceptual organization (Zhai & Razali, 2023).

However, it is notable that respondents assessed themselves as less competent in interpreting differences in test results and in discussing statistical findings, while they thought they were competent in interpreting descriptive statistics and drawing insights from data, and they perceived themselves as highly competent in explaining the relationship between test findings and presenting findings visually. Although data analysis is the most complex and mysterious phase in research (Tabuena & Tabuena, 2021), test results on differences are more complex to explain than descriptive and test findings relationships since numerous theories and concepts are built around associations between or among variables, and descriptive statistics and visual presentation of data are rather basic skills in understanding simpler statistical results.

In contrast, test results on differences necessitate comparison and identification of reasons behind group differences, which require additional evidence beyond statistical results. Numerous novice researchers encounter difficulties explaining the meaning of their results, discussing emerging patterns, and relating findings to existing scholarship (Ansyari et al., 2022). Thus, statistical analysis, argumentation, and academic writing are the key competencies that structured training in research writing should target to increase the acceptance of the research in peer-reviewed journals, and publishability (Samosa, 2021).

In addition, it can be inferred that before the capacity-building intervention, the respondents were perceived to be skilled at making summaries and giving advice through recommendations and future works. They even perceived themselves as highly competent in writing a cohesive final report, especially when all data are available and analyzed, and could be transformed into a coherent research discourse. Looking at their curriculum, making summaries, giving suggestions, and writing coherent discourses are timeless academic skills that are always taught in any discipline and are emphasized more in language instruction. This is why students think they can be proficient at these academic writing skills.

Nevertheless, they found difficulty in highlighting practical implications of their study as they viewed themselves as less competent in this aspect of academic writing in research discourse, while they assessed themselves as incompetent in drawing data-supported conclusions. Student researchers frequently encountered difficulties in writing conclusions that reflected study findings accurately while addressing research objectives and theoretical implications (Bocar, 2013; Lee & Lee, 2022). Scientific analysis requires an analytical, systematic method that gathers, analyses, and evaluates large data points as the basis for drawing relevant conclusions (Tabuena & Tabuena, 2021). Making generalizations from analyzed data and even explaining its implications or applications in real-life settings is a much more complex cognitive activity and an ability that requires in-depth cognizance of the issue to be explicated fully in the textual presentation of a research discourse.

However, after the extension-based training sessions, the emerging researchers perceived themselves as highly competent in the aforementioned academic writing competencies in research discourse. The iterative cycle of revision, such as drafting and the feedback provided to the emerging researchers during the implementation of the intervention, contributed to their academic writing competency enhancement. This intervention feature aids in the learning of students to formulate conclusions grounded in empirical evidence, discuss implications for policy and practice, acknowledge study limitations, and recommend directions for future research (Lee & Lee, 2022),

5.2 Level of Quality of Research Outputs of the Respondents Before and After the Capacity Development on Academic Writing in Research Discourse

The main weakness in the research proposals was the vague and unfocused problem statements, which were broad, hypothetical, and lacked grounding in data or literature. Similarly, objectives were unclear, generic, and misaligned with the problem, instead of being SMART. Misalignment often weakens the internal

logic of research reports and limits their contribution to scholarly discourse (Peungcharoenkun & Waluyo, 2023). Specifically, the emerging researchers were most challenged in formulating the research problem and in justifying the significance of their study. These aspects of academic research writing in research discourse are the building blocks of one's research directions. If these are not provided sufficiently and justified in the research work, the reason that the investigation should be conducted and the way one can attract readers and stir appreciation from the academic community would be at risk. In the topic formulation at the research phase, the researcher should articulate a research topic that could function as a motivator and driver for research (Abdulai & Owusu-Ansah, 2014). Ellis and Levy (2008) also accentuated the essence of a well-articulated, research-worthy problem statement as the centerpiece for any potential research work.

5.3 Difference in Academic Writing Proficiency in Research Discourse and Research Output Quality Before and After Intervention

With the small-to-moderate magnitude of the effect of the intervention, it could be deduced that the six-session capacity-building development of academic writing proficiency in research discourse contributed positively to their research skills enhancement and to the refinement of the quality of their research outputs. The inherent features of the aforesaid capacity development underscored the integration of lectures, hands-on activities, and targeted research consultations after each lecture. The mentoring strategy accentuated the employment of one-on-one and small-group consultations to ensure in-depth understanding of the research concepts during the lecture phase of the capacity-building intervention.

Essentially, lesson contextualization in adherence to student-centered approaches toward knowledge construction and skills enhancement (Delgado, 2024), collaborative research, and hands-on training or mentorship (Almonicar, 2022; Cagaanan & Gosadan, 2018) are ingredients for research competence and output quality improvement. Similarly, Suleiman et al. (2017) also highlighted the significance of peer feedback and continuous mentoring to sustain research writing proficiency advancement. Consequently, extension-based capacity-building initiatives offered by higher education institutions have emerged as important mechanisms for improving research culture among basic education teachers through sustained professional development and collaborative learning (González-Laguna et al., 2024).

6. Conclusion

In terms of academic writing proficiency in research discourse, the emerging researchers had struggled initially in writing literature review-based research gap analysis, leading to indicating soundly the significance of the study, as well as in the discussion of results and implications of the study, owing to the complex cognitive skills associated with these competencies. However, they had produced research outputs which were initially fairly satisfactory but were greatly improved and rated outstanding after the implementation of the extension-based capacity development on academic writing proficiency in research discourse. The learning intervention contributed to the enhancement of the research writing

competencies of the respondents and to the quality level of their research outputs. Evidently, the participants demonstrated substantial improvement across all areas of academic writing in research discourse, reflecting the effectiveness of the structure, inherent features, and delivery of the intervention. The utilization of diverse pedagogical activities such as lectures, hands-on and authentic tasks, and structured mentoring paved the way to a comprehensive and meaningful learning experience that enhanced their academic writing abilities to conceptualize, organize, and articulate research ideas with greater coherence and academic rigor.

A distinctive feature that made this capacity-building intervention successful was the provision of targeted research consultations after each lecture, proving that one-on-one and small-group consultations validated the necessity for personalized guidance in mastering the complexities of academic writing in research discourse. Moreover, the research utilized a self-report questionnaire on academic writing competencies in research discourse, although augmented with authentic tasks like research output evaluation. Similarly, the lack of a control group affects the confidence and certainty level of the research claim regarding the attributed skills improvement. Thus, future research may consider a more manipulated research experimental setup by including a control and treatment group to strengthen the research findings of the study.

Likewise, a communicative test may also be considered as pre-assessment and post-assessment research tools to describe the academic writing proficiency of respondents in research discourse, aside from the self-report questionnaire to ensure that skills are assessed authentically and comprehensively. In addition, future research may look into the demographic variables that affect the development of research competencies among learners as well as teachers to determine how factors such as academic background, field of specialization, and research exposure influence learning outcomes.

By and large, HEIs and various community partners should continue to fortify their partnerships and connection with a pool of research experts for constant provision of structured and scaffolded learning interventions as community engagement initiatives that target the enhancement of research writing skills and the quality of the improvement of research outputs among their stakeholders. Moreover, the conducting of research symposiums or colloquiums with external panelists as evaluators is recommended to sustain a culture of research excellence in the institution and its partner communities.

7. Acknowledgments

The researcher used Grammarly only as an editing tool to ensure the grammaticality of the manuscript.

8. References

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