

Attainment of Research Learning Outcomes among Senior High School

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Abstract. Using a descriptive quantitative research design, this study aimed to assess the attainment of learning outcomes in Research among 272 Senior High School students across Practical Research 1, Practical Research 2, and Research Project. Data were analyzed using weighted mean to evaluate students' level of attainment and One-Way ANOVA to determine significant differences across subjects. Results revealed that while students attain the expected learning outcomes, gaps remain in research conceptualization and methodological application. Despite the overall attainment, the study exposes a research gap in the consistency and depth of students' research skills across the three subjects. These findings highlight the need for targeted instructional improvements to ensure students are comprehensively prepared for higher academic and professional research demands.

Keywords: Learning outcomes; Practical research 1; Practical research 2; Research project; Senior high school.

1.0 Introduction

Research is a systematic inquiry process that enables individuals to explore, analyze, and generate new knowledge based on empirical evidence. It fosters critical thinking, problem-solving, and intellectual growth, making it a vital skill in academic development (Ghanad, 2023). In the context of the Philippine education system, particularly under the K-12 reform program introduced through Republic Act No. 10533, research education in Senior High School (SHS) plays a role in preparing students for higher education and future careers. Students engage in a structured research sequence to build foundational and applied research competencies as part of this reform. These subjects require students to conceptualize a problem, design a methodology, collect and analyze data, and effectively communicate findings. However, despite this structure, existing literature reveals that Senior High School students frequently encounter challenges in attaining these learning outcomes.

Several studies have documented recurring difficulties such as formulating research questions, defining the scope and focus of studies, constructing thesis statements, applying correct methodologies, and writing research papers in a coherent academic format (Jose & Salim, 2023; Sitompul & Anditasari, 2022). Moreover, Jimenez (2024) highlights the impact of language proficiency on students' ability to articulate research findings, which further impedes their overall research performance. Although these studies highlight various barriers to research success, there is limited empirical evidence specifically examining how well Senior High School students achieve intended learning outcomes across the progressive stages of their research education. This gap

indicates a need to assess the effectiveness of practical research instruction and identify critical points where students struggle most.

At the University of Saint Louis, the Senior High School research program mirrors the national curriculum structure, gradually developing students' competencies from basic proposal writing in Practical Research 1 to data analysis in Practical Research 2, culminating in data collection during the Research Project. While this scaffolded approach is designed to equip students with essential research skills, the extent to which students attain the prescribed learning outcomes remains underexplored.

Thus, this study aimed to assess the attainment of learning outcomes in Practical Research 1, Practical Research 2, and the Research Project. This study provides evidence on outcome attainment and identifies areas of difficulty that may require targeted pedagogical interventions. The significance of this study lies in its contribution to improving research instruction at the SHS level, bridging the gap between curricular expectations and actual student performance. In doing so, it offers actionable insights for educators and curriculum developers seeking to enhance the delivery and effectiveness of research education in secondary schools.

2.0 Methodology

2.1 Research Design

The study utilized a quantitative approach employing a descriptive research design, which was deemed appropriate in capturing the current status of Senior High School students' attainment of learning outcomes in Practical Research 1, Practical Research 2, and the Research Project. This design enables the systematic collection and analysis of numerical data to describe trends, levels of achievement, and specific areas where students may be encountering difficulties, thereby supporting the study's objective of evaluating instructional effectiveness and informing potential improvements in research education.

2.2 Research Locale

The study was conducted at the University of Saint Louis Tuguegarao because it offers a structured research program for Senior High School students, including Practical Research 1, Practical Research 2, and the Research Project. As a recognized institution implementing the K-12 curriculum with a strong emphasis on research education, it provided an ideal setting to assess the attainment of research learning outcomes and explore the challenges students face throughout the research process.

2.3 Research Participants

The study's respondents were the 272 Senior High School Students who had taken Research subjects selected through stratified random sampling.

2.4 Research Instrument

The study utilized a questionnaire as its data gathering tool. It was adopted in Molina's study (2019) with a Cronbach's alpha of 0.85, which is interpreted as good. No modifications were made to the original instrument to maintain its validity and reliability. Part I consisted of the profile of the respondents. Part II was attaining learning outcomes in Practical Research 1, 2, and the Research Project. The questionnaire was validated by three experts: a professor specializing in curriculum and instruction, a research coordinator, and an experienced Senior High School teacher with a background in research.

2.5 Data Gathering Procedure

The researchers first sought permission from the Senior Director of the University Research and Innovation Office to conduct the study. Once approval was granted, the researchers administered the questionnaire to the participants via Google Forms. To ensure proper facilitation and supervision of the questionnaire's administration, the researchers obtained permission from the Grade 12 advisers. The data gathering was conducted over two weeks. The quantitative data collected through the questionnaire were then analyzed to assess students' attainment of learning outcomes.

2.6 Ethical Considerations

Before data collection began, the respondents received a detailed briefing about the study's objectives and were informed about their right to withdraw from the study at any time. To ensure transparency, participants signed an informed consent form online. All collected data were stored in password-protected files and secure folders to protect participants' privacy. Per the Data Privacy Act (RA 10173), all information was kept confidential and handled with care to prevent unauthorized access and ensure participants' privacy.

3.0 Results and Discussion

Table 1 shows that most students employ quantitative research and conduct health sciences research.

Table 1. Characteristics of the Respondents			
Profile	Categories	Frequency	Percentage
Type of Research	Quantitative	198	72.79
	Qualitative	47	17.28
	Mixed Method	27	9.93
	Total	272	100.00
Nature of Research	Business and Economics	37	13.60
	Education	15	5.51
	Health Sciences	121	44.49
	Science and Technology	78	28.68
	Social Sciences	21	7.72
	Total	272	100.00

Table 2 indicates that students generally attained the necessary research competencies across the three key research components: Practical Research 1, Practical Research 2, and the Research Project. In Practical Research 1, students demonstrated an ability to understand and conceptualize research ideas. This aligns with findings by Baranova et al. (2023), who emphasize that adequate research conceptualization is a foundational skill. However, students still need guidance in refining and translating these concepts into clear and specific research objectives, which requires continuous feedback to ensure their ideas remain focused.

Table 2. Attainment of Learning Outcomes in Research		
Learning Outcomes	Mean	Interpretation
Practical Research 1	3.31	Attained
Practical Research 2	3.27	Attained
Research Project	3.20	Attained
Overall	3.26	Attained
*Range Interpretation		
3.50-4.00-Fully Attained		
2.50-3.49-Attained		
1.50-2.49-Partially Attained		
1.00-1.49-Not Attained		

In Practical Research 2, students exhibited competence in identifying appropriate research designs and articulating their relevance to the research objectives. However, they encountered challenges applying these designs effectively, particularly in real-world contexts. This is consistent with Qasem (2019), who found that students often struggle to transfer theoretical knowledge of research designs to practical applications. To bridge this gap, hands-on experiences and case studies could help students refine their skills in selecting and implementing research designs.

For the Research Project, students could collect and process data and apply basic analytical methods. However, there were gaps in their ability to select the most appropriate analysis techniques for their research questions. This resonates with Koerfer and Gregorcic (2024), who note that data analysis remains challenging, especially when choosing suitable statistical methods. To address this, students would benefit from exposure to complex datasets and statistical software training, as Hashmi suggested (2022). By providing more opportunities to work with diverse data types, students can gain the confidence and expertise to apply advanced analysis techniques effectively.

Overall, while students have attained the basic learning outcomes in each key area, further improvement is needed to master these skills fully. As Adam (2020) highlights, continued exposure to real-world research scenarios and targeted training in refining research concepts, selecting appropriate research designs, and applying advanced data analysis methods will better equip students for independent, impactful research. These improvements will enable students to contribute meaningfully to their academic fields.

Table 3 presents the test of significant differences in the level of attainment of learning outcomes in Practical Research 1 when grouped according to profile variables. The findings show no significant difference based on the type of research, suggesting that the methodological approach does not significantly influence students' competence or understanding of the research process.

Table 3. *Test of Significant Difference in the Level of Attainment of Learning Outcomes in Practical Research 1 When grouped according to Profile Variables*

Profile	f-value	p-value	Decision
Type of Research	0.10	0.90	Not Significant
Nature of Research	4.55	0.00	Significant

*Significant at 0.05 level of significance

However, a significant difference was found when students were grouped according to the nature of their research. This indicates that the discipline or field of study impacts students' ability to meet learning outcomes. Students engaged in more concrete or structured research topics may find it easier to identify research gaps and organize their studies effectively. This highlights the influence of research context on academic performance, as supported by Hong et al. (2023), who emphasized the role of disciplinary background in shaping research competence.

Table 4 shows significant differences in the level of attainment of learning outcomes in Practical Research 1 when students are grouped according to the nature of research. Specifically, Business, Economics, and Health Sciences students demonstrated higher attainment than those in Social Sciences. This suggests that the field of study plays a role in shaping how well students achieve the learning outcomes, with some disciplines offering more opportunities or a stronger foundation for research skills.

Table 4. *Post Hoc Analysis on the Test of Significant Difference in the Level of Attainment of Learning Outcomes in Practical Research 1 When grouped according to the Nature of Research*

Nature of Research		Mean Difference	p-value
Business and Economics	Social Sciences	0.50	0.00
Social Sciences	Health Sciences	-0.32	0.01

*Significant at 0.05 level of significance

Furthermore, students conducting research in Business and Economics and Health Sciences may have more concrete and clearly defined topics, which helps them identify research gaps (Servado, 2024). These fields are often closely aligned with real-world applications, making identifying relevant and timely research topics easier. According to Katzmayer et al. (2023), Business and Economics research typically revolves around industry trends, financial systems, and organizational behavior, areas that offer tangible outcomes for research. In Health Sciences, the focus on clinical studies, healthcare policies, and medical advancements provides students with clear parameters for conducting practical and impactful research (Mekiš, 2023). These allow students to develop research topics that are both specific and applicable, enhancing their ability to conceptualize and structure their research effectively.

Table 5 presents the test of significant differences in the level of attainment of learning outcomes in Practical Research 2 when grouped according to profile variables. The findings indicate no significant difference in the attainment level based on the research type. This suggests that the type of research methodology, whether qualitative, quantitative, or mixed methods, attains similar levels of competence in aspects such as writing the background of the study, selecting an appropriate research design, formulating research questions, and describing the sample. This is consistent with the work of Thiem et al. (2023), who argued that while the methodology may influence the overall design of the research, it does not inherently lead to a significant variation in how students develop basic research competencies.

Table 5. *Test of Significant Difference in the Level of Attainment of Learning Outcomes in Practical Research 2 When grouped according to Profile Variables*

Profile	f-value	p-value	Decision
Type of Research	1.01	0.37	Not Significant
Nature of Research	3.62	0.00	Significant

*Significant at the 0.05 level of significance

However, the table shows a significant difference in the level of attainment when students are grouped according to the nature of their research. This indicates that the discipline or area of study plays a significant role in students' achievement of learning outcomes in Practical Research 2. The nature of research may influence how students approach the process of writing the introduction, selecting the appropriate research design, formulating specific and feasible research questions, and describing samples. Research in specific fields might provide more concrete examples or better support for students in developing these critical components of their research projects. According to Marvier et al. (2023), the nature of the research topic can shape students' understanding of research design, influencing how they write their introduction or frame their research questions.

Table 6 shows the post hoc analysis on the test of significant differences in the level of attainment of learning outcomes in Practical Research 2 when students are grouped according to the nature of research. Specifically, students in Business and Economics achieved higher levels of attainment than those in Education and Social Sciences. This finding suggests that the field of study plays a role in how students perform in Practical Research 2, particularly when it comes to writing the introduction, selecting the appropriate research design, formulating research questions, and describing the sample.

Table 6. *Post Hoc Analysis on the Test of Significant Difference in the Level of Attainment of Learning Outcomes in Practical Research 2 When grouped according to the Nature of Research*

Nature of Research		Mean Difference	p-value
Business and Economics	Education	0.42	0.04
Business and Economics	Social Sciences	0.46	0.00

*Significant at the 0.05 level of significance

Business and Economics students may have an advantage due to the more structured and applied nature of research within this discipline. Research topics in Business and Economics tend to be well-defined, often dealing with real-world problems that require clear objectives and measurable outcomes. This clarity may help students more easily formulate research questions, select suitable research designs, and describe their samples effectively. Additionally, students in Business and Economics often work with quantitative data, which typically involves more straightforward methodologies for research design and sampling. According to Katzmayer et al. (2023), research in more structured fields provides students with a more transparent framework for developing research methodologies, which can enhance their ability to meet the required learning outcomes. Similarly, Baranova et al. (2023) noted that more applied fields like Business and Economics provide students with a more transparent research structure, facilitating their ability to identify research questions and design appropriate methodologies.

Table 7 presents the test of significant differences in the level of attainment of learning outcomes in the Research Project when students are grouped according to profile variables. The findings indicate no significant difference in the attainment level based on the research type. This suggests that whether students engage in qualitative or quantitative research does not significantly affect their overall ability to achieve the learning outcomes in the Research Project. In other words, students across both types of research approaches perform similarly when gathering, presenting, analyzing data, and making conclusions and recommendations.

Table 7. *Test of Significant Difference in the Level of Attainment of Learning Outcomes in Research Project When grouped according to Profile Variables*

Profile	f-value	p-value	Decision
Type of Research	0.30	0.74	Not Significant
Nature of Research	4.57	0.00	Significant

*Significant at the 0.05 level of significance

However, a significant difference is observed in the attainment of learning outcomes when grouped according to the nature of research. This indicates that the field or discipline of the research plays an important role in shaping how well students perform in the Research Project. Students from different fields may approach data gathering, presentation, and analysis differently, which can affect their outcomes. As highlighted by Tullu (2019), the nature of research can influence students' approach to their research design, data collection, and analysis, ultimately impacting their research outcomes.

Table 8 reveals significant differences in the level of attainment of learning outcomes in the Research Project when students are grouped according to the nature of research. Specifically, business and economics students demonstrated higher attainment than those in social sciences, science, and technology. This suggests that students conducting research in Business and Economics may have more structured and defined research processes, which facilitate a higher level of performance in the research project.

Table 8. Post Hoc Analysis on the Test of Significant Difference in the Level of Attainment of Learning Outcomes in the Research Project When grouped according to the Nature of Research

Nature of Research		Mean Difference	p-value
Business and Economics	Social Sciences	0.52	0.00
Business and Economics	Science and Technology	0.32	0.03

*Significant at the 0.05 level of significance

The difference in attainment could be attributed to the practical and applied nature of Business and Economics research, which often involves clear real-world applications and readily available data for analysis. According to Miller et al. (2023), such fields provide more concrete frameworks and research methodologies, which may lead to more effective data gathering, analysis, and presentation. On the other hand, social sciences and science and technology research might involve more abstract or complex variables, which can present challenges to student data collection and analysis. Additionally, the nature of the research in these fields might require more sophisticated or varied methodologies, potentially contributing to the observed differences in learning outcomes. These findings align with the view of Banu et al. (2022), who emphasized that the context and nature of research play a role in shaping the research process and influencing the quality of research outcomes.

4.0 Conclusion

Senior High School students could attain the intended learning outcomes in Practical Research 1, 2, and the Research Project. The study confirms that students can demonstrate essential research skills and knowledge when provided with appropriate guidance and opportunities for application. Additionally, significant differences in learning outcomes based on profile variables highlight the need for differentiated instruction and support that consider the diverse research contexts in which students engage. Furthermore, these findings support enhancing the curriculum through discipline-specific activities and training teachers to provide targeted research support. Future studies may explore how instructional strategies influence research skills across student groups.

5.0 Contributions of Authors

Mabborang, Jomel M.- Author

6.0 Funding

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7.0 Conflict of Interests

None

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