

Exploring Factors Affecting Reading Comprehension Skills: A Quasi-Experimental Study on Academic Track Strands, Learning Modalities, and Gender

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Abstract This scientific report presents a comprehensive methodology and materials employed to investigate the significant difference in reading comprehension skills among Senior High School students. The study examines the impact of academic track strands, learning modalities, and gender differences on reading comprehension. The quasi-experimental design and a range of statistical tools were utilized to analyze the data. The results revealed significant variations in reading comprehension skills based on academic track strands and learning modalities, while gender differences were found to be insignificant. Building upon the findings, an intervention program is proposed to enhance reading comprehension skills. This research contributes valuable insights to inform educators and policymakers in developing targeted interventions and instructional approaches for improving reading comprehension abilities.

Keywords: *reading comprehension, quasi-experimental design, academic track strands, learning modalities, gender differences, intervention program*

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1. Introduction

Words on a page hold the power to shape destinies, but without the key to comprehension, they remain a cryptic puzzle waiting to be solved. The ability to understand and extract meaning from written language is a gateway to success, influencing every aspect of one's life. Yet, the pressing reality is that a growing number of senior high school students are grappling with the enigma of reading comprehension, their potential hindered by this elusive skill.

In the quest for accessible and quality education, the K to 12 Program of the Department of Education in the Philippines has undergone a transformative journey, aimed at nurturing the essential skills and competencies of Filipino learners. However, despite these efforts, the country still faces a formidable challenge—a staggering number of individuals, spanning various age groups, struggle to comprehend what they read. This disheartening revelation beckons us to address the gaps and disparities in reading comprehension skills among learners.

To shed light on this critical issue, our study embarks on a motivated endeavor to assess the perceived levels of reading comprehension skills among senior high school

students. By conducting pretest and posttest evaluations, we seek to uncover the depths of their reading comprehension abilities and pinpoint the areas where intervention is most needed. Armed with these invaluable insights, we aim to recommend a tailored reading intervention program that will bridge the gap and empower struggling learners in their journey toward mastery.

Research Questions:

To guide our investigation, we pose the following thought-provoking questions:

1. Is there a significant difference between the pretest and posttest results in terms of reading comprehension?
2. Do the mean reading comprehension scores significantly differ among respondents when grouped by strand?
3. Are there significant differences in the mean reading comprehension scores among respondents when grouped by learning modality?
4. Is there a significant difference between the mean reading comprehension scores of male and female respondents?
5. Based on our findings, what intervention program can be proposed to enhance the reading comprehension skills of the respondents?

Hypotheses:

In our pursuit of uncovering the truth, we put forth the following hypotheses:

H_{01} : The online reading instructional materials do not yield significant improvements in the respondents' comprehension levels.

H_{02} : The comprehension levels of the respondents using online instructional materials do not differ based on their strand.

H_{03} : The comprehension levels of the respondents using online instructional materials do not differ when grouped by learning modality.

H_{04} : There is no significant difference in comprehension levels between male and female respondents using online instructional materials.

With the backdrop of these compelling research questions and hypotheses, we embark on a journey that intertwines the complexities of reading comprehension with the urgent need to equip our learners for success. Drawing inspiration from the rich theoretical framework of Schema Theory, we explore how readers utilize their existing knowledge to unlock meaning from text. Furthermore, we delve into the three levels of comprehension—literal, inferential, and critical/evaluative—unveiling the multifaceted nature of understanding.

As we delve into this study, we cannot overlook the global context that propels our pursuit for improvement. The Philippines' recent dismal ranking in reading comprehension among 79 countries, as revealed by [1], serves as a clarion call for action. It is imperative that we rise above these challenges and forge a path toward enhanced literacy and comprehension skills.

In this journey towards unraveling the mysteries of reading comprehension, we must confront the issues head-on, armed with evidence and a commitment to change. By identifying the underlying problems and gaps that hinder learners from unlocking the power of language, we lay the groundwork for innovative strategies, methodologies, and programs that will transform the landscape of comprehension. Our ultimate goal is to empower learners with the 21st-century skills of critical thinking, collaboration, and problem-solving, enabling them to triumph in both their academic and personal lives.

Through the pages of this research, we embark on a transformative quest—one that seeks to illuminate the path toward improved reading comprehension, one word at a time.

1.1. Conceptual Framework

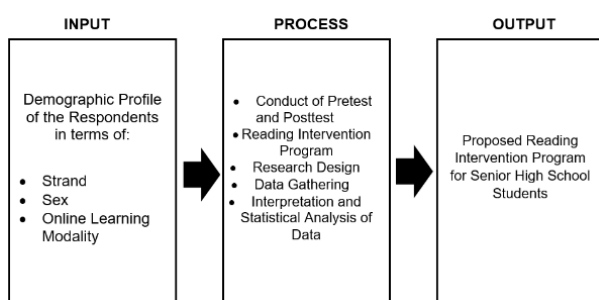


Figure 1. Research Paradigm

Figure 1 shows the input, process and output of the study. Under the input is the demographic profile of the respondents in terms of strand, sex and online learning modality, while under the process are the conduct of pretest and posttest, reading intervention program application, research design, data gathering procedure, interpretation and statistical analysis of data and lastly under the output is the proposed reading intervention program for the senior high school students.

2. Literature Review

Over the years, educational professionals and language specialists have delved into the issue of poor reading comprehension skills among learners. They have tirelessly sought solutions to address the growing number of students who struggle with reading, especially at higher levels, and who find it challenging to understand even simple texts. The act of reading extends beyond the mere deciphering of letters and words; it encompasses the engagement of pre-existing knowledge and the formulation of anticipatory hypotheses. This section explores the existing literature and highlights the unique contributions of the present study.

2.1. Effective Strategies for Reading Comprehension

Reading comprehension is a complex process that involves the interaction between readers and texts within a social context. Scholars have proposed various strategies to improve reading comprehension, which are detailed in this section. These strategies, such as activating background knowledge, asking questions, making inferences, predicting, summarizing, and visualizing, have a profound impact on enhancing learners' reading abilities [2,3,4]. Implementing these strategies can significantly improve learners' comprehension skills.

2.2. Reading Comprehension Skills in the Philippines Context

In the Philippines, reading and reading comprehension skills are closely intertwined. To develop comprehension, students must acquire a range of skills. The concept of reading comprehension is vast and vital, representing the ultimate goal of reading. In this study, the aim is to develop a reading primer that integrates various reading skills, including comprehension, to ensure long-lasting learning. The Department of Education in the Philippines recognizes the importance of reading literacy and has implemented the "Every Child A Reader Program" (ECARP) to foster basic literacy skills among students. However, there is still a need for improvement, as evidenced by weak academic performance and low reading proficiency among learners [5,6,7].

2.3. Reading Intervention Program

Several methodologies for improving reading proficiency and addressing independent-level learners have been suggested. These approaches encompass Peer

Assisted Learning Strategies (PALS), Targeted Reading Intervention, Quick Reads, Cooperative Integrated Reading and Composition (CIRC), as well as Jostens/Compass Learning [8]. Additionally, effective teaching strategies, close monitoring of progress, provision of remedial reading, and adequate instructional materials are crucial for improving reading comprehension skills [5]. Several literacy intervention programs, such as Accelerated Reader and Read 180, have demonstrated significant impacts on learners' reading proficiency [8], [9].

2.4. Distance Learning Education

Distance learning, defined as remote education facilitated by technology, has gained prominence in recent years. Students engage in independent learning without face-to-face interactions with instructors or peers. The flexibility and convenience of distance learning have garnered positive attitudes among learners, who appreciate the ability to learn at their own pace and convenience [10], [11]. Various platforms and modalities, such as webinars and learning management systems, enable synchronous or asynchronous online education, offering geographic flexibility and real-time interaction [12,13].

3. Methods and Materials

In order to achieve the study's objectives, a quasi-experimental design was employed to evaluate the substantial disparity in reading comprehension skills between two non-equivalent groups prior to and following the implementation of the intervention program. As stated by [14], a quasi-experimental design involves the utilization of a pretest and posttest assessment with two groups. This design is commonly applied in natural group settings, such as educational institutions, where existing classes are selected in their current state, minimizing potential manipulations. Quasi-experimental designs provide researchers with flexibility in assigning interventions and estimating their unintended effects on the target population [15,16].

3.1. Population and Sampling

To conduct the present study, the researchers employed a population sampling method known as convenience sampling. This approach involved selecting participants based on their easy accessibility and availability, allowing for a convenient and practical way of gathering data. By utilizing this sampling strategy, the researchers were able to efficiently collect information from individuals who were readily accessible and willing to participate.

To determine the appropriate sample size for the study, a priori statistical power analysis was conducted using the G*Power Suite, a widely used software tool for power analysis. This analysis considered several factors, including the desired statistical power of 0.95, an effect size of 0.30, and an alpha level of 0.05. Based on these parameters, it was determined that a sample size of 128 respondents would be necessary to meet the desired criteria.

Within this sample size of 128 participants, the study revealed specific characteristics of the population. Among the participants, 49 individuals were enrolled in the HUMMS program, highlighting the significant representation of this academic strand in the sample. Additionally, 32 participants belonged to the ICT program, indicating a notable presence of students from this field of study. Furthermore, 17 respondents were from the HE strand, showcasing the inclusion of individuals pursuing Home Economics track. Finally, 49 participants identified themselves as belonging to the Maritime strand, highlighting the diverse representation of students with an interest in this particular field.

By employing a convenience sampling approach and determining an appropriate sample size, the researchers were able to effectively capture a range of participants from different academic backgrounds. This approach allowed for a practical and accessible means of gathering data, contributing to the comprehensiveness and generalizability of the study's findings.

3.2. Respondents of the Study

The researchers handpicked a diverse group of respondents for the study, focusing on Senior High School students. These students are currently enrolled in four distinct strands within the SHS curriculum, namely Humanities and Social Sciences, Maritime, Information Communications Technology, and Home Economics. By including students from different educational pathways, the study aims to capture a wide range of perspectives and experiences within the senior high school context.

3.3. Research Instruments

The researchers employed a meticulously crafted survey questionnaire as their primary research instrument to gather data for the study. This custom-made instrument was carefully designed to align with the research problem, ensuring consistency and relevance. Given the quantitative nature of the study, the survey questionnaire played a crucial role in recruiting participants and collecting data, as noted by [17] citing [18].

The research instrument consisted of two sections. The first section focused on gathering demographic information about the respondents, including their strand of study, gender, and online learning modality. The second section comprised reading comprehension questions specifically tailored to assess the respondents' skills. These questions covered various aspects of reading comprehension, such as utilizing context clues, making comparisons, identifying main ideas, locating topic sentences, recognizing supporting details, drawing inferences, identifying implicit statements, providing directions, and discerning the author's attitude or tone.

To ensure the content validity of the reading comprehension questions, they were adapted from [19]. Moreover, the assessment content was contextualized and aligned with the Most Essential Learning Competencies outlined by the Department of Education, encompassing senior high school English subjects like Reading and Writing, Oral Communication, 21st Century Literature, and English for Academic and Professional Purposes. This

careful alignment aimed to ensure the relevance and appropriateness of the assessment within the educational framework.

3.4. Validators' Profile

Validity is an essential aspect of any assessment, as it verifies whether the test accurately assesses its intended constructs. In this study, the researchers meticulously addressed the issue of the validity of their instruments. To achieve this objective, they sought the expertise of three renowned validators with extensive experience in instrument validation. These validators possessed exceptional knowledge and skills in the relevant field, ensuring the rigor and accuracy of the validation process. Their expertise was invaluable in strengthening the credibility and authenticity of the study's instruments, thus enhancing the overall trustworthiness of the findings.

3.5. Validation of the Instrument

In ensuring the validity of the research instruments, the validators employed a rigorous process. They conducted content validation to align the instrument's terms with the study's objectives. Face validation was utilized to assess the materials' user-friendliness and convenience for the respondents. Additionally, expert validation confirmed that the instrument's alignment with the chosen topic and rationale.

The validators followed the eight criteria for research instrument validation proposed by [20]. These criteria provided a robust framework to evaluate the instruments' quality, encompassing factors such as relevance, clarity, and comprehensiveness. Through this thorough validation process, the research instruments gained credibility and accuracy, enhancing the trustworthiness of the study's findings.

3.6. Data Gathering Procedure

To ensure the integrity of the research process and minimize bias, the researchers implemented a series of procedures. Following the approval of three knowledgeable validators, the research instruments underwent rigorous reliability and pilot testing. The reliability test yielded satisfactory results, indicating a good rating (0.80-0.89) according to Cronbach's alpha, and the pilot testing phase was deemed successful.

To safeguard the collected data, the researchers employed various measures. First and foremost, a cloud-based storage solution, specifically Google Drive, was utilized to securely store crucial information, including results from Google Forms. As an additional precautionary measure, a portable hard drive was employed, with the researcher ensuring its safety and accessibility.

Afterward, with data security ensured, the validated survey questionnaire's content was transferred to a Google Sheet for the respondents' assessment. Individual copies of the survey questionnaire link were then sent via Facebook Messenger to each respondent and their respective groups for the pretest phase.

Following the pretest, the researcher diligently tallied the results and conducted an item analysis to identify the top three least mastered reading comprehension skills among the respondents. Armed with this knowledge, the researchers introduced an intervention program called "Independent Intervention Activity" (IIA) through Facebook Messenger. The IIA consisted of online instructional materials, including video lessons and PowerPoint presentations converted into PDF format, focusing on the identified least mastered skills: identifying supporting details, comparing and contrasting, and recognizing author's tone. After a span of two weeks, the posttest was administered, and the resulting data were carefully tabulated, interpreted, and subjected to thorough analysis using appropriate statistical tools.

3.7. Statistical Tools and Treatment

The following statistical tools and treatments were used for the research questions and hypotheses:

The methodology employed in this paper follows a structured approach. It involved the following steps to analyze the significant difference between pretest and posttest results, compare mean reading comprehension scores among respondents grouped by strand and learning modality, and examine differences between male and female respondents. Additionally, the findings were used to propose an intervention program for improving reading comprehension skills.

According to the results of the Kolmogorov-Smirnov test, the statistic value for the "PRETEST SCORE" variable was found to be 0.120 ($D = 0.120$), with 128 degrees of freedom. The associated p-value was determined to be 0.000, indicating a significant departure from normality. As the p-value is less than the chosen significance level of 0.05, it can be concluded that the "PRETEST SCORE" variable deviates significantly from a normal distribution. In contrast, the Shapiro-Wilk test yielded a statistic value of 0.982 ($W = 0.982$) with 128 degrees of freedom. The corresponding p-value was determined to be 0.090, which is greater than the chosen significance level of 0.05. Therefore, based on the Shapiro-Wilk test, the "PRETEST SCORE" variable does not show a significant departure from normality ($p > .05$).

According to the results of the normality tests, the Kolmogorov-Smirnov test showed a statistic value of 0.110 ($D = 0.110$) with 128 degrees of freedom. The associated p-value was determined to be 0.001, indicating a significant departure from normality for the "POST-TEST SCORE" variable ($p < .001$). Similarly, the Shapiro-Wilk test yielded a statistic value of 0.969 ($W = 0.969$) with 128 degrees of freedom. The corresponding p-value was found to be 0.005, which is less than the chosen significance level of 0.05. Therefore, based on the Shapiro-Wilk test, the "POST TEST SCORE" variable also shows a significant departure from normality ($p = .005$). These findings suggest that both the Kolmogorov-Smirnov and Shapiro-Wilk tests provide evidence that the distribution of the "POST-TEST SCORE" variable deviates significantly from a normal distribution..

In light of this non-normality, the Wilcoxon signed-rank test was employed to determine whether a significant difference existed between the pretest and posttest results

in terms of reading comprehension. This non-parametric test allows for reliable analysis and robust conclusions, even in the presence of non-normal data distributions. A combination of parametric and nonparametric statistical tools was then utilized by the researchers.

Additionally, a one-way analysis of variance (ANOVA) was performed to examine the mean reading comprehension scores when respondents were grouped by strand and learning modality. Post-hoc tests such as Scheffe's and Tukey's Honestly Significant Difference were conducted to identify specific differences between groups.

Furthermore, an independent-sample t-test was used to compare the mean reading comprehension scores between male and female respondents. This analysis aimed to determine if a significant difference existed between the two groups.

Finally, the results obtained from the statistical analyses were interpreted and analyzed to identify areas for improvement in reading comprehension skills. Based on these findings, an intervention program targeting the specific areas identified as needing improvement could be proposed.

4. Results and Discussion

The researchers showcase the wealth of data collected from the respondents, skillfully employing a diverse array of statistical tools to delve into the research questions. Through an intriguing synthesis of summarization, interpretation, and vivid discussion, the data obtained from the online surveys are brought to life, paving the way for the attainment of the study's objectives.

4.1. Difference of Pretest-Posttest Reading Comprehension Skills of the Respondents

Exciting findings emerged from the analysis of the pretest-posttest results, revealing the progress made in the reading comprehension skills of the respondents.

Table 1. Comparison of Pretest and Posttest Scores in Reading Comprehension Skills: Paired Samples Wilcoxon Rank-Sum Test

Hypothesis Test Summary			
The median of differences between PRE SCORE and POST SCORE IS 0	Related- Samples Wilcoxon Signed Rank Test	0.001	Reject Null Hypothesis

The Kolmogorov-Smirnov and Shapiro-Wilk tests results in section 3.7 revealed that the p-values associated with the posttest were both below 0.05, indicating a significant departure from normality. To address the non-normality of the data, the study utilized the Wilcoxon signed-rank test, which allows for accurate analysis and dependable conclusions despite the violation of normality assumptions. By utilizing the Wilcoxon signed-rank test, the study overcomes the assumption of normality and allows for reliable conclusions.

The results of the related samples' Wilcoxon signed-rank test indicated a significant difference between the pretest and posttest scores in terms of reading comprehension skills ($p = .001$). Therefore, the null

hypothesis, which states that the median of the differences between the pretest and posttest scores is equal to 0, was rejected. These findings suggest that there is a statistically significant change in the reading comprehension skills of the respondents from the pretest to the posttest.

This suggests that the reading intervention program, implemented by the researcher through the utilization of video and digital learning materials for independent learning, effectively contributed to the enhancement of the respondents' reading comprehension skills. The results align with the findings of previous studies conducted by [21], which demonstrated significant improvements in students' reading comprehension abilities following the implementation of blended synchronous and asynchronous learning approaches.

The statistically significant improvement in reading comprehension skills observed in this study underscores the importance of targeted interventions and the use of multimedia resources in fostering effective independent learning. It further highlights the potential of blended learning methods in supporting students' comprehension of various reading texts.

4.2. Relationship between the Reading Comprehension of the Respondents and Their Strand

The respondents' demographic profile and their reading comprehension skills were statistically computed to know if there is a significant relationship.

Table 2. The ANOVA Results on the Effect of Academic Strand on the Reading Comprehension Skills of the Selected Respondents

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	113.19 9144	3	37.733 04806	4.204 26709 5	0.007 1816	2.6776 9903
Within Groups	1112.8 9265	124	8.9749 40747			
Total	1226.0 918	127				

Table 3. Post Hoc test Results for the effects of Academic strands on Reading Comprehension

Post Hoc Tests	(I) A. Strand	(J) A. Strand	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	HUMSS	HUMSS	-0.2714	0.6809	0.978	-2.045	1.502
		MARITIME	0.7531	0.7613	0.756	-1.23	2.736
		HE	2.6002 [*]	0.8991	0.023	0.259	4.942
	ICT	ICT	0.2714	0.6809	0.978	-1.502	2.045
		HUMSS	1.0245	0.6945	0.456	-0.784	2.833
		HE	2.8715 [*]	0.8433	0.005	0.676	5.068
	MARIME	ICT	-0.7531	0.7613	0.756	-2.736	1.23
		HUMSS	-1.0245	0.6945	0.456	-2.833	0.784
		HE	1.8471	0.9095	0.182	-0.521	4.215
	HE	ICT	-2.6002 [*]	0.8991	0.023	-4.942	-0.259
		HUMSS	-2.8715 [*]	0.8433	0.005	-5.068	-0.676
		MARITIME	-1.8471	0.9095	0.182	-4.215	0.521
Scheffe	HUMSS	HUMSS	-0.2714	0.6809	0.984	-2.201	1.658
		MARITIME	0.7531	0.7613	0.806	-1.405	2.911
		HE	2.6002 [*]	0.8991	0.043	0.052	5.149
	ICT	ICT	0.2714	0.6809	0.984	-1.658	2.201
		HUMSS	1.0245	0.6945	0.539	-0.944	2.993
		HE	2.8715 [*]	0.8433	0.011	0.481	5.262
	MARITIME	ICT	-0.7531	0.7613	0.806	-2.911	1.405
		HUMSS	-1.0245	0.6945	0.539	-2.993	0.944
		HE	1.8471	0.9095	0.254	-0.731	4.425
	HE	ICT	-2.6002 [*]	0.8991	0.043	-5.149	-0.052
		HUMSS	-2.8715 [*]	0.8433	0.011	-5.262	-0.481
		MARITIME	-1.8471	0.9095	0.254	-4.425	0.731

*. The mean difference is significant at the 0.05 level.

A one-way analysis of variance (ANOVA) was conducted to examine the differences in the means of the respondents' Reading Comprehension Skills based on their academic track strands. The results, as shown in Table 2, revealed that there was a statistically significant difference among the means of the groups ($F(3,124) = 4.204$, $p = 0.007$) at a significance level of $\alpha = 0.05$. The significant result of the ANOVA test suggests that the respondents' academic track strands have an impact on their Reading Comprehension Skills.

The post hoc analysis revealed significant differences in mean scores among the groups as shown in Table 3. Tukey HSD identified a significant mean difference between the ICT Group and the HE Group ($t(1, 4) = 2.600^*$, $p = .023$, 95% CI [.259, 4.942]). Similarly, a significant mean difference was found between the HUMSS Group and the HE Group ($t(2, 4) = 2.871^*$, $p = .005$, 95% CI [.676, 5.068]). These results were consistent with the findings obtained from Scheffe's analysis, which showed a significant mean difference between the ICT Group and the HE Group ($t(1, 4) = 2.600^*$, $p = .043$, 95% CI [.052, 5.149]), as well as between the HUMSS Group and the HE Group ($t(2, 4) = 2.871^*$, $p = .011$, 95% CI [.481, 5.262]). However, no statistically significant mean differences were observed in the other comparisons between groups.

The significant differences in mean scores found between the ICT and HUMSS groups when compared to the HE Group provide valuable insights into the educational landscape. These findings suggest that students in the ICT and HUMSS disciplines have distinct mean scores, which may reflect variations in their educational experiences, knowledge, or skills.

This finding implies that the academic track or strand pursued by the respondents has an influence on their reading comprehension abilities. It suggests that students from different academic tracks may possess varying levels of proficiency in reading comprehension. Identifying these differences can aid in tailoring instructional approaches and interventions to meet the specific needs of students in each academic track.

It is important for educators and policymakers to recognize the impact of academic track strands on reading comprehension skills and develop strategies to support students in enhancing their reading abilities. By understanding these differences, targeted interventions can be implemented to address specific challenges or areas for improvement among students from different academic track strands.

4.3. Relationship between the Reading Comprehension of the Respondents and Their Learning Modality

A one-way analysis of variance (ANOVA) was conducted to examine the effect of Online Learning Modalities on the Reading Comprehension skills of the selected respondents. The significance level was set at 0.05. The results, as presented in Table 4, revealed a statistically significant difference among at least two groups of Learning Modalities in terms of Reading Comprehension Skills ($F = 3.90$, $p = 0.02276$). The

significant result of the ANOVA test indicates that the chosen Learning Modalities had an impact on the respondents' Reading Comprehension skills.

Table 4. The ANOVA Results on the Effect of Online Learning Modality on the Reading Comprehension Skills of the Selected Respondents

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	72.009944	2	36.00497	3.89974	0.02276	3.068689
Within Groups	1154.0819	125	9.232655			
Total	1226.0918	127				

Table 5. Post Hoc Test Results for the Effects of Online Learning Modalities on Reading Comprehension

Post Hoc Test	Online Learning Modality	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Tukey HSD	Synchronous	Asynchronous	0.8101	0.383	-0.638	2.258
		Blended	-1.7279	0.8367	-3.713	0.257
	Asynchronous	Synchronous	-0.8101	0.383	-2.258	0.638
		Blended	-2.5380*	0.9092	-4.694	-0.382
	Blended	Synchronous	1.7279	0.8367	-0.257	3.713
		Asynchronous	2.5380*	0.9092	0.382	4.694
	Synchronous	Asynchronous	0.8101	0.417	-0.702	2.322
		Blended	-1.7279	0.8367	-3.801	0.345
Scheffe	Asynchronous	Synchronous	-0.8101	0.6104	-2.322	0.702
		Blended	-2.5380*	0.9092	-4.79	-0.286
	Blended	Synchronous	1.7279	0.8367	-0.345	3.801
		Asynchronous	2.5380*	0.9092	0.286	4.79

*. The mean difference is significant at the 0.05 level.

Post hoc tests were conducted to explore pairwise comparisons between the learning modalities. The Tukey HSD and Scheffe post hoc tests revealed that asynchronous online learning demonstrated a significant advantage over blended learning in terms of improving reading comprehension (Tukey HSD: $M_{diff} = -2.5380$, $p = 0.017$; Scheffe: $M_{diff} = -2.5380$, $p = 0.023$). Additionally, synchronous online learning did not differ significantly from blended learning in terms of reading comprehension performance (Tukey HSD: $M_{diff} = -1.7279$, $p = 0.101$; Scheffe: $M_{diff} = -1.7279$, $p = 0.123$). However, it is worth noting that asynchronous online learning outperformed synchronous online learning, although the difference was not statistically significant (Tukey HSD: $M_{diff} = -0.8101$, $p = 0.383$; Scheffe: $M_{diff} = -0.8101$, $p = 0.417$).

These findings contrast with existing literature on the effects of different online learning modalities on reading comprehension. The results contradict the findings of [22], who reported better reading comprehension performance for blended learning than synchronous online learning. The divergence in outcomes may be attributed to variations in instructional design, curriculum content, and participant characteristics.

This study demonstrated that asynchronous online learning yielded significantly better reading comprehension outcomes compared to blended learning. These results contribute to the existing body of literature on the effectiveness of different learning modalities in enhancing reading comprehension skills. The findings suggest that incorporating asynchronous online learning components, such as self-paced activities and interactive

discussions, may be beneficial for promoting reading comprehension abilities. Further research is warranted to explore the underlying mechanisms and refine blended learning strategies to optimize reading comprehension outcomes.

It is important to acknowledge certain limitations of this study. Firstly, the investigation focused solely on reading comprehension and did not consider other dimensions of learning outcomes or potential factors influencing reading comprehension, such as prior knowledge or student engagement. Future studies should incorporate a broader range of variables to provide a more comprehensive understanding of the effects of different learning modalities on reading comprehension. Additionally, the study was conducted within a specific educational setting, which may limit the generalizability of the findings to other contexts. Further research should include diverse populations and settings to enhance the external validity of the results.

These findings suggest that the choice of Online Learning Modality influences the level of Reading Comprehension skills among the respondents. It implies that different approaches to online learning may result in variations in students' reading comprehension abilities. Understanding these differences can inform educators and instructional designers in selecting and optimizing appropriate online learning modalities to enhance students' reading comprehension skills.

It is crucial for educational institutions and practitioners to consider the impact of Online Learning Modalities on reading comprehension. By recognizing the significance of these differences, educators can tailor instructional strategies and provide appropriate support to students based on their preferred learning modalities. Additionally, further research can explore specific factors within each modality that contribute to variations in reading comprehension outcomes, enabling the development of targeted interventions and improvements in online learning experiences.

4.4. Relationship between the Reading Comprehension of the Respondents and Their Gender.

Table 6. The Means of the Male and Female Respondents in Reading Comprehension Skills

Sex	N	Mean	Std.		Std. Error
			Deviation	Mean	
READING COMPRE4NSION Female	53	14.575	2.9717	0.4082	
Male	75	14.507	3.2189	0.3717	

The mean reading comprehension score for female respondents was 14.575 (SD = 2.9717), whereas the mean reading comprehension score for male respondents was 14.507 (SD = 3.2189). The standard error mean for female respondents was 0.4082, and for male respondents, it was 0.3717.

Table 7. The t-test Results on the Comprehension Levels between Male and Female Respondents using Online Instructional Materials

	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Confidence	
								Lower	Upper
READING COMPRE4NSION Equal variances assumed	1.176	0.280	0.123	126	0.902	0.0688	0.5597	-1.0389	1.1765
Equal variances not assumed			0.125	117.309	0.901	0.0688	0.5521	-1.0245	1.1621

In this scientific report, an independent samples t-test was employed to compare the reading comprehension scores of male and female respondents (refer to Table 7). The assumption of equal variances was tested, and the results revealed no significant difference ($t(126) = 0.123$, $p = 0.902$, $d = 0.0688$). This lack of significance was observed in both cases where equal variances were assumed ($t(126) = 1.176$, $p = 0.280$) and when equal variances were not assumed ($t(117.309) = 0.125$, $p = 0.901$). The mean difference between male and female reading comprehension scores was 0.0688, with a standard error difference of 0.5521. The 95% confidence interval for the difference ranged from -1.0389 to 1.1765 when equal variances were assumed, and from -1.0245 to 1.1621 when equal variances were not assumed.

These findings indicate that there was no statistically significant difference in reading comprehension scores between male and female respondents. The effect size (Cohen's d) was small ($d = 0.0688$), suggesting a negligible practical difference between the groups. These results align with the study conducted by [23] on Reading Comprehension Level among Intermediate Learners, which also reported no significant difference between genders in terms of reading comprehension. Furthermore, the study by [24] also indicated no significant difference in the overall performance of males and females on the reading comprehension test.

However, it is important to acknowledge that some studies have reported contradictory findings, suggesting potential gender differences in reading comprehension. For instance, [25] revealed that girls excelled over boys in reading achievement. Additionally, consistent reports from [26] suggest that females tend to outperform males in reading abilities. These disparities may be attributed to variations in sample characteristics, measurement instruments, and experimental designs employed in different studies.

While the present results contribute to the existing literature, it is crucial to consider the limitations of the study, such as the specific sample used and the measurement instruments employed. Further research, incorporating larger and more diverse samples, may offer additional insights into the potential differences or similarities in reading comprehension between female and male individuals. By exploring these nuances, a more comprehensive understanding of this aspect of cognitive development can be achieved.

4.5. Proposed Intervention Program to Improve the Reading Comprehension Skills of the Respondents

The present study aimed to investigate the reading comprehension skills of the respondents and identified

several factors that influence their performance. Building on these findings, this section proposes a creative intervention program designed to enhance the reading comprehension skills of the respondents. By incorporating innovative strategies and tailored approaches, this intervention program aims to address the identified challenges and improve reading comprehension abilities.

Program Objectives:

- To enhance reading comprehension skills among respondents by providing targeted interventions.
- To foster a positive reading culture and develop a love for reading among participants.
- To equip respondents with effective reading strategies and techniques to improve comprehension and critical thinking skills.
- To promote active engagement with various types of texts and genres.

Program Components:

1. Comprehensive Reading Curriculum:

- Develop a well-structured curriculum that covers various reading comprehension strategies, including predicting, questioning, summarizing, and making connections in real-life situations.
- Incorporate a range of engaging texts and materials suitable for different reading levels and interests.
- Provide opportunities for both independent and guided reading practice.

2. Interactive Reading Workshops:

- Conduct interactive workshops to teach respondents effective reading strategies and techniques.
- Utilize creative activities, such as group discussions, role-playing, and hands-on exercises, to actively engage participants in the learning process.
- Encourage critical thinking and analysis of the reading material through interactive exercises and open-ended discussions.

3. Digital Resources and Technology Integration:

- Leverage digital resources, such as e-books, online reading platforms, and educational apps, to enhance accessibility and engagement.
- Integrate technology tools that support reading comprehension, such as interactive quizzes, multimedia presentations, and online collaborative activities.
- Provide guidance on utilizing digital tools effectively and responsibly.

Reading Mentorship Program:

- Establish a mentorship program where advanced readers or volunteers from the community can support and guide participants in their reading journey.
- Pair respondents with mentors who can provide personalized assistance, recommend appropriate reading materials, and inspire a love for reading.

Reading Clubs and Events:

- Organize reading clubs or book clubs to create a supportive reading community.
- Host reading events, such as author visits, storytelling sessions, and book fairs, to promote enthusiasm for reading and expose respondents to a diverse range of literary experiences.

Regular Assessments and Progress Monitoring:

- Implement regular assessments to track the progress of respondents and identify areas for improvement.
- Provide timely feedback and individualized support based on assessment results.
- Celebrate achievements and recognize the efforts of participants to foster motivation and a sense of accomplishment.

The proposed intervention program aims to address the identified gaps in reading comprehension skills among respondents. By incorporating innovative strategies, interactive workshops, technology integration, mentorship, and community engagement, this program seeks to create a stimulating learning environment that promotes reading comprehension growth. It is crucial to adapt and tailor the program to the specific needs and characteristics of the respondents. Implementing this intervention program has the potential to significantly enhance the reading comprehension skills of the participants and empower them as confident and proficient readers.

5. Conclusions

In conclusion, this study aimed to investigate the relationship between demographic factors, learning modalities, and reading comprehension skills among the chosen respondents. The findings revealed several important insights.

Firstly, there was a significant difference in reading comprehension skills based on academic track strands. Specifically, respondents from different academic track strands demonstrated varying levels of reading comprehension proficiency. This suggests that the chosen academic track strand may have an impact on the development of reading comprehension skills.

Secondly, the study found a significant difference in reading comprehension skills across different learning modalities. The results indicated that the chosen learning modality influenced the participants' reading comprehension abilities. This highlights the importance of considering the appropriate learning modality when designing interventions or instructional strategies to enhance reading comprehension skills.

Furthermore, the analysis of gender differences in reading comprehension skills revealed no statistically significant disparity between males and females. This suggests that gender does not play a significant role in determining the level of reading comprehension among the chosen respondents.

Overall, this study provides valuable insights into the factors that influence reading comprehension skills among the chosen respondents. The findings underscore the significance of academic track strands and learning modalities in shaping reading comprehension abilities. These results can inform educators and policymakers in developing targeted interventions and instructional approaches to improve reading comprehension skills among students. However, it is important to note that further research is warranted to explore additional factors that may contribute to reading comprehension proficiency and to validate these findings in larger and more diverse populations.

6. Implications to Research and Practice

The implications of this study reach beyond the realm of academia and have far-reaching implications for educational institutions, policymakers, and even parents. The findings shed light on several key areas that can significantly impact the development of reading comprehension skills among students.

First and foremost, the study highlights the importance of considering academic track strands when designing educational programs and interventions. By recognizing the significant differences in reading comprehension skills across different academic tracks, educational institutions can tailor their curricula and teaching strategies to better support students' specific needs. This insight can lead to more targeted approaches that address the unique challenges and requirements of each academic track, ultimately enhancing students' overall reading comprehension abilities.

Additionally, the findings underscore the crucial role of learning modalities in fostering reading comprehension skills. Educators and instructional designers can utilize this knowledge to create engaging and effective learning experiences that align with the preferred modalities of students. By incorporating a variety of modalities, such as synchronous and asynchronous learning, video-based instruction, and interactive digital materials, educators can cater to diverse learning preferences and optimize students' comprehension of reading materials.

Moreover, the study challenges traditional assumptions regarding gender differences in reading comprehension skills. The findings suggest that gender may not be a determining factor in students' reading abilities. This challenges stereotypical notions and emphasizes the importance of creating inclusive and unbiased educational environments that provide equal opportunities for all students, regardless of their gender. Educators and parents can focus on promoting a supportive and gender-neutral learning environment that encourages and enhances reading comprehension skills for all students.

These implications have significant practical implications for educational institutions aiming to improve reading comprehension outcomes. By taking into account the diverse needs of students based on their academic track strands, providing varied learning modalities, and challenging gender biases, educators can create a more inclusive and effective learning environment that fosters the development of strong reading comprehension skills among all students.

Furthermore, the findings of this study encourage further exploration and research into the factors that influence reading comprehension skills. Future studies can delve deeper into the impact of other demographic variables, such as socioeconomic status and cultural background, and their relationship with reading comprehension outcomes. Such research can provide a more comprehensive understanding of the multiple factors at play and inform evidence-based practices that enhance reading comprehension instruction.

In conclusion, the implications of this study go beyond the boundaries of academic research and hold immense significance for educational stakeholders. By recognizing the influence of academic track strands, learning

modalities, and challenging gender biases, educators and policymakers can shape educational practices that promote and enhance reading comprehension skills among students, ultimately empowering them to become critical thinkers, effective communicators, and lifelong learners.

7. Recommendations

Based on the findings and implications of this study, several recommendations can be made to further enhance the understanding of reading comprehension skills and improve educational practices:

Academic Track-Specific Interventions: Educational institutions should consider developing targeted interventions and instructional strategies tailored to the specific needs of different academic track strands. By recognizing the variations in reading comprehension skills among academic tracks, educators can provide focused support and resources to enhance reading comprehension abilities within each track.

Blended Learning Approaches: Incorporating a variety of learning modalities, including synchronous and asynchronous methods, video-based instruction, and interactive digital materials, can maximize student engagement and comprehension. Educators should continue to explore and implement blended learning approaches that cater to diverse learning preferences, enabling students to effectively develop their reading comprehension skills.

Gender-Inclusive Instruction: Educators and curriculum designers should create gender-inclusive learning environments that promote equal opportunities for all students to enhance their reading comprehension skills. By challenging gender biases and stereotypes, educational institutions can foster an inclusive atmosphere that supports the reading abilities of both male and female students.

Longitudinal Studies: Conducting longitudinal studies can provide valuable insights into the development and progress of reading comprehension skills over time. By tracking students' reading abilities from early education through higher levels, researchers can identify patterns, potential gaps, and effective interventions to support long-term reading comprehension growth.

Cross-Cultural Research: Further research should explore the influence of cultural backgrounds and socioeconomic factors on reading comprehension skills. Comparative studies across different cultural contexts and socioeconomic settings can reveal valuable insights into the diverse factors impacting reading comprehension and inform the development of culturally responsive instructional practices.

Professional Development for Educators: Educators should be provided with ongoing professional development opportunities focused on enhancing their understanding of effective reading comprehension instruction. Training programs can equip teachers with the necessary knowledge, strategies, and resources to create engaging and impactful learning experiences for their students.

Collaboration and Knowledge Sharing: Encouraging collaboration and knowledge sharing among researchers,

educators, and policymakers is crucial for advancing the field of reading comprehension instruction. Regular forums, conferences, and publications should be promoted to facilitate the exchange of best practices, innovative approaches, and research findings, leading to continuous improvement in reading comprehension instruction.

By implementing these recommendations, educational institutions can foster a supportive and inclusive learning environment that empowers students to develop strong reading comprehension skills. Furthermore, ongoing research and collaborative efforts will contribute to the collective understanding of effective instructional practices, leading to improved reading comprehension outcomes for students worldwide.

References

- [1] Ratzel San Juan (2019, December 3). Philippines Lowest in Reading Comprehension among 79 Countries. Philstar Global. <https://www.philstar.com/headlines/2019/12/03/1974002/philippines-lowest-reading-comprehension-among-79-countries>
- [2] Danielle S. McNamara, Joe Magliano, Chapter 9 Toward a Comprehensive Model of Comprehension, *Psychology of Learning and Motivation*, Academic Press, Volume 51, 2009, Pages 297-384, [https://doi.org/10.1016/S0079-7421\(09\)51009-2](https://doi.org/10.1016/S0079-7421(09)51009-2). <https://www.sciencedirect.com/science/article/pii/S0079742109510092>
- [3] Wood, E., Woloshyn, V. E., & Willoughby, T. (1995). *Cognitive strategy instruction for middle and high schools*. Cambridge, MA: Brookline Books
- [4] Gambrell, L. B., & Bales, R. J. (1986). Mental Imagery and the Comprehension-Monitoring Performance of Fourth- and Fifth-Grade Poor Readers. *Reading Research Quarterly*, 21(4), 454-464. <https://doi.org/10.2307/747616>
- [5] Estremera ML & GL. (2018). Factors Affecting the Reading Comprehension of Grade Six Pupils in the City Division of Sorsogon, Philippines as Basis for the Development of Instructional Materials. *Asia Pacific Journal of Education, Arts and Sciences*, 5(3), 72-78.
- [6] Flynn, L. L. (1989). Developing Critical Reading Skills through Cooperative Problem Solving. *The Reading Teacher*, 42(9), 664-668. <http://www.jstor.org/stable/20200271>
- [7] Villamin, A. M., Salazar, E. S., & Gatmaitan, W. (1987). *Developmental Reading*. Phoenix Publishing House.
- [8] Cabardo, J. R. O. (2015). Reading Proficiency Level of Students: Basis for Reading Intervention Program. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.2712237>
- [9] Alvermann, D.E., Fitzgerald, J., & Simpson, M. (2006). Teaching and learning in reading. In P. Alexander & P. Winne (Eds.), *Handbook of Educational Psychology* (2nd ed., pp. 427-455)
- [10] Bower, B.L., & Kamata, A. (2000). Factors Influencing Student Satisfaction with Online Courses. *Academic exchange quarterly*, 4, 52.
- [11] Matthews, D. (1999). The Origins of Distance Education and Its Use in the United States. *T.H.E. Journal*, 27(2), Retrieved August 6, 2023 from <https://www.learntechlib.org/p/89339/>
- [12] Ebner C and Gegenfurtner A (2019). Learning and Satisfaction in Webinar, Online, and Face-to-Face Instruction: A Meta-Analysis. *Front. Educ.* 4:92. doi: 10.3389/educ.2019.00092
- [13] Wang, S.-K., and Hsu, H.-Y. (2008). Use of the webinar tool (Elluminate) to support training: the effects of webinar-learning implementation from student-trainers' perspective. *J. Interact. Online Learn.* 7, 175-194
- [14] Gonzales, J. E. (2020). The Effect of Video Presentation and Printed Reading Materials on Pupils' Comprehension Skills. *Applied Science and Innovative Research*, 4(4). Retrieved from www.scholink.org/ojs/index.php/asir
- [15] Dinardo, J. (2008). "Natural experiments and quasi-natural experiments". *The New Palgrave Dictionary of Economics*; pp. 856-859.
- [16] Dinardo, J.. (2010). Natural Experiments and Quasi-Natural Experiments. 10.1057/9780230280816_18.
- [17] Ponto, J. (2015, April 1). Understanding and evaluating survey research. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4601897/>
- [18] Check J., Schutt R. K. Survey research. In: J. Check, R. K. Schutt., editors. *Research methods in education*. Thousand Oaks, CA:: Sage Publications; 2012. pp. 159-185
- [19] Learning Express, LLC. (2006). 501 Reading Comprehension Questions (3rd ed.). LearningExpress, LLC.
- [20] Good, C.V., & Scates, D.E. (1972). In Paler-Calmorin, L., & Calmorin, M.A. (1997). *Statistics in education and the sciences*. Manila, Philippines: Rex Bookstore
- [21] Zuhriyah M., Fajarina M. (2022, April). The Effectiveness of Blended Synchronous and Asynchronous Learning for Teaching Reading Comprehension. *Al-Ishlah: Jurnal Pendidikan*
- [22] GÜNEŞ, S., & ALAGÖZLÜ, N. (2021). Asynchronous Distance Learning and Blended Learning in terms of Learner Autonomy, Motivation and Academic Success. *The Turkish Online Journal of Educational Technology*, 20(3), 54-65.
- [23] Miñoza, M. & Montero, M. (2019). Reading Comprehension Level among Intermediate Learners. *Sci.Int.(Lahore)*
- [24] Vlachos, F., & Papadimitriou, A. (2015). Effect of age and gender on children's reading performance: The possible neural underpinnings. *Cogent Psychology*, 2, 1-10. <http://dx.doi.org/10.1080/23311908.2015.1045224>
- [25] Shahmohammadi, N. (2011). The Effect of Gender Base Materials on Reading Comprehension. *International Journal of Human Resource Studies*, 1(2), 10-14.
- [26] Tiarina, Y., Wahyuni, S., Fitri, D., Sakinah, N., & Afif, A. F. (2022). PISA reading literacy: encountering female and male' reading literacy ability. *English Review: Journal of English Education*, 10(2), 593-602. <https://doi.org/10.25134/erjee.v10i2.6263>



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