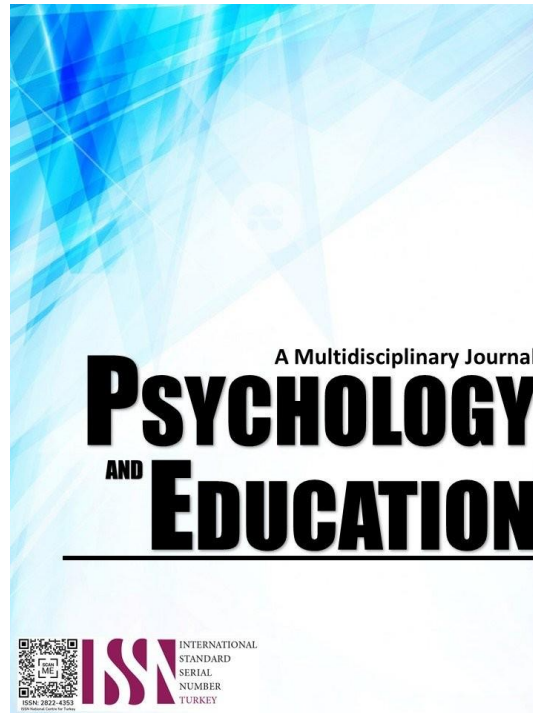


EVALUATING THE APTNESS OF ONLINE LEARNING MODALITY DURING THE PANDEMIC: ESTABLISHING A CAUSAL RELATIONSHIP BETWEEN LEARNING OUTCOMES AND MODALITY QUALITY



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Evaluating the Aptness of Online Learning Modality During the Pandemic: Establishing a Causal Relationship Between Learning Outcomes and Modality Quality

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Abstract

The rapid expansion of online education due to the pandemic necessitates an examination of the relationship between online learning quality and academic performance. This study utilizes a mixed-methods approach, combining multiple regression analysis and thematic analysis, to explore this relationship comprehensively. The multiple regression analysis, with a significant p-value of 0.00 ($p < 0.05$), establishes a clear connection between online learning quality and academic performance, affirming our hypothesis. This statistical foundation forms the basis of our investigation. In parallel, the thematic analysis delves into practical dimensions, gathering insights from interviews with Lyceum of Cebu, Inc.- Barili Campus students who experienced online classes during the 2021-2022 school year. It uncovers effective teaching strategies, emphasizing the positive impact of high-quality online learning on learning outcomes. The analysis also highlights the significance of regular virtual discussions and proactive teacher-student communication, which enhance interaction and accountability, leading to improved academic performance. Furthermore, the thematic analysis identifies key determinants of learning outcomes within the home online learning environment. Factors such as parental support, a conducive study environment, and opportunities for socialization and collaboration are linked to online learning quality. In conclusion, this integrated approach provides a comprehensive understanding of the relationship between online learning quality and academic performance. It emphasizes the crucial role of a well-designed online learning environment in achieving positive learning outcomes, highlighting the need for ongoing research and action to enhance online education's accessibility and quality.

Keywords: *quality of online learning modality, quality online education, learning outcomes, academic performance, senior high school*

Introduction

In line with Article XIV, Section 1 of the 1987 Constitution, emphasizing the right to quality education, ensuring that our future citizens receive deserving education is essential. The Department of Education (DepEd) introduced distance learning methods in response to the COVID-19 pandemic to address the challenges faced by 27.7 million enrolled learners in basic education (Yang & Beam, 2021). The pandemic's potential long-term harm and impact on competitiveness make it crucial to act (Cho, 2021).

The internet has revolutionized information access but can lead to information overload, affecting students negatively (Bawden & Robinson, 2021). However, online learning has gained acceptance in the 21st century, offering flexibility and accessibility (Tang et al., 2023). Acknowledging the dual nature of the internet's impact, policies and interventions are needed to ensure effective technology use in online learning environments. This study investigates Senior High School learners' Learning Outcomes (LO) and the Quality of Online Learning Modality (QOLM) during the pandemic to establish a causal relationship, considering DepEd's distance learning adoption for two consecutive school years.

The research assesses the Online Learning Modality (OLM) experience of senior high school students at Lyceum of Cebu, Inc. – Barili Campus, using regression and thematic analysis. It aims to inform best practices in online classes and contribute to the development of online learning modalities in senior high schools across the Philippines. The theoretical background explores the relationship between QOLM (independent variable) and LO (dependent variable), considering relevant theories and legal basis. DepEd Order no. 032, s. 2020 and Republic Act (RA) No. 10533 support DepEd's commitment to education during the pandemic through various learning delivery modalities. The study considers cognitive load theory (Sweller, 1980), social learning theory (Reed et al., 2023), communication theory (Wang et al., 2022), multiple intelligences theory (Doblon, 2023), and self-determination theory (Huang and Wang) to inform the evaluation of online learning modality quality.

Research Questions

This research evaluates the quality of online learning modality for Grade 12 students at Lyceum of Cebu, Inc. – Barili Campus during the 2021-2022 pandemic school year, providing data for planning enriched online class supervisory strategies as an intervention. Specifically, this sought to answer the following sub-problems.

1. What is the profile of the students in terms of:
 - 1.1 age and gender; and
 - 1.2 strand?
2. What is the quality of online learning modality as experienced by the students in terms of;
 - 2.1 teaching indicator (pedagogical strategies, teaching presence, & teacher preparation);

- 2.2 technological indicator (internet connectivity, gadget efficiency, & online learning apps/ websites experience); and
- 2.3 online learning environment indicator (parental involvement, conduciveness, & online social interaction)?
3. What is the level of the learning outcomes attained by the students during the pandemic school year 2021-2022 reflected in their academic performance?
4. Is there a relationship between the student's level of learning outcome to the following;
 - 4.1 age;
 - 4.2 gender;
 - 4.3 strand; and
 - 4.4 quality of online learning modality?
5. What are the themes that can be found under the implementation of online learning modality through the following;
 - 5.1 teaching indicator (pedagogical strategies, teaching presence, & teacher preparation);
 - 5.2 technological indicator (internet connectivity, gadget efficiency, & online learning apps/ websites experience); and
 - 5.3 online learning environment indicator (parental involvement, conduciveness, & online social interaction)?
6. Is there a causal relationship between the quality of online learning modality (QOLM) and learning outcomes as reflected in the academic performance through triangulation?
7. Based on the significant findings of the study, what recommendations can be raised?

Methodology

To fully grasp the research subject, this study used a mixed-methods convergent parallel design, gathering both quantitative and qualitative data simultaneously. Specifically, the study focuses on assessing the level of quality of online learning modality (QOLM) as experienced by grade 12 students and the factors that caused their academic performance during the pandemic. This design enabled triangulation to strengthen the establishment of causation during the regression analysis stage by converging data from the research instruments. The regression analysis aided with triangulation strengthened the conclusions by confirming or bringing together data from other sources and metrics. Thus, improving the validity of the regression analysis, supported the reliability of the findings, and reduced potential biases. In general, the researchers reinforced the causal claims or links found in the regression analysis and gave a more solid foundation for the result by triangulating the data.

This study used a mixed sampling technique to accommodate both quantitative and qualitative data. Under the quantitative data collection, the respondents were chosen through a stratified random sampling technique from the Senior High School population of Lyceum of Cebu, Inc. Barili Campus (LOC-BC) enrolled during the pandemic school year 2021-2022. The study participants were chosen based on the study's goal, which required the participation of senior high school students who were able to continue their education through online modality.

On the other hand, purposive sampling with inclusion criteria was used for the qualitative data collection. The sample size was not a subject to saturation and presented a decent representation of the population to diversify the perceptions on the factors that caused how well the students were in the attainment of learning outcomes through online learning modality. Both sampling methods further strengthened the reliability and validity of conclusions and properly accounted their online learning experiences. Consequently, the institution, LOC-BC, provided informed consent to engage in the study before the addressees approved it.

Table 1. *Quantitative Data Collection Respondents*

<i>Strand</i>	<i>Universal Population (F)</i>	<i>Sample (F)</i>	<i>Percentage (%)</i>
ABM	11	9	12%
GAS	8	7	10%
HUMSS	44	36	51%
STEM	23	19	27%
TOTAL	86	71	100%

LOC-BC has a total of 86 students in its grade 12 population, which is divided into four distinct strands. To ensure a comprehensive representation, a suitable sampling technique has to be stratified random sampling. This technique involves treating each strand as a separate stratum, allowing for proportional sampling from each group. In order to determine the appropriate sample size for each stratum, Slovin's formula was applied. By utilizing Slovin's formula, with a confidence level of 95% and an acceptance margin of error set at 0.05, an effective stratified sample was obtained, providing reliable insights into the entire grade 12 population of LOC-BC.

Based on the sampling technique employed, the study gathered data from a total of 71 research respondents. Specifically, 12% of the population are 9 respondents from the ABM strand, 10% are 7 respondents from the Gas strand, 36 respondents which constitutes 51% from the HUMSS strand, and 27% translates 19 respondents from the STEM strand. These numbers reflect the distribution of participants across the different strands, allowing for a comprehensive analysis of the research.

The remaining fifteen (15) students, ABM 2, GAS 1, HUMSS 8, and STEM 4, who were not admitted as respondents to the quantitative data collection were admitted to the qualitative data collection, granted meeting the conditions of the inclusion criteria to remove the possibility of a band-wagon effect-- having the influence of the survey questionnaire in answering the interview questions. Through

this, the researchers maintained the integrity of independent data collection.

Since this study utilized the convergent parallel design, the researchers had two instruments to ensure the collection of contextual data that aligns with the research objectives quantitatively and qualitatively. Researchers employed a comprehensive approach to data collection, including both quantitative and qualitative methods. Quantitative data were gathered using a survey questionnaire, refined for validity and reliability through a pilot test. Cronbach's Alpha ensured item consistency. The survey had two parts: Part I gathered student profiles (age, gender, academic strand), and Part II assessed online learning quality for grade 12 students across three indicators: teaching, technology, and homeschooling environment.

To complement this, a separate cohort of participants was engaged for qualitative insights, aligning with specific indicators derived from the Theoretical Framework. Interviews explored students' online learning experiences, emphasizing teaching quality, technology integration, and the home learning environment. The data collection process began with a formal consent request to the research environment administrator. Clear instructions were provided to participants, emphasizing study objectives, procedures, and confidentiality. A conducive environment was maintained during data collection, allowing thoughtful responses.

Following data collection, survey responses underwent tabulation and statistical analysis to identify insights and trends. Ethical considerations were paramount throughout the research, with a focus on participant rights and well-being. Participants were informed, gave voluntary consent, and enjoyed confidentiality. Vulnerable groups were treated with care, and minors required parental consent. A debriefing was provided after data collection, and steps were taken to minimize risks and maintain data integrity. Transparent reporting and disclosure of conflicts of interest ensured research credibility.

Table 2. *Qualitative Data Collection Respondents*

<i>Strand</i>	<i>Universal Population (F)</i>	<i>Sample (F)</i>	<i>Percentage (%)</i>
ABM	11	2	13%
GAS	8	1	7%
HUMSS	44	8	53%
STEM	23	4	27%
TOTAL	86	15	100%

Results and Discussion

This study included Senior High School students from Lyceum of Cebu, Inc. Barili Campus, totaling 86 students across four strands: ABM, GAS, HUMSS, and STEM. Quantitative data was collected from 71 students using stratified random sampling, while qualitative data was gathered from 15 students through purposive sampling. Demographic variables included age, gender, and strand in the respondents' profiles.

Prominent researchers have extensively studied how age affects learning outcomes. In this study, we examined the age distribution of our respondents (table 3).

Table 3. *Age of Respondents*

<i>Age</i>	<i>Frequency</i>	<i>Percent %</i>
20 years old	5	5.81
19 years old	24	27.91
18 years old	44	51.16
17 years old	13	15.12
Total	86	100.00

Among the surveyed population, 5.81% were 20 years old, and 27.91% were 19 years old. The largest group, constituting 51.16%, fell into the 18-year-old category. Additionally, 15.12% of respondents were 17 years old. It's worth noting that CHED (2017) defines senior high school students as typically falling within the age range of 16 to 18 years. Our findings align with this age range, confirming the consistency with CHED's definition for senior high school students.

Gender is a recognized variable with potential impacts on self-regulated learning, educational achievements, and the learning journey, as discussed by Anazifa et al. (2023). Table 4 illustrates the gender distribution among the respondents in this study.

Table 4. *Gender of Respondents*

<i>Gender</i>	<i>Frequency</i>	<i>Percent %</i>
Male	40	46.51
Female	46	53.49
Total	86	100.00

Among the respondents, 46.51% were male (40 respondents), and 53.49% were female (46 respondents). These proportions closely match the 2021-2022 enrollment data reported by the Department of Education (DepEd) in 2022, which indicates a higher number of female senior high school students. Thus, our sample's gender distribution objectively reflects the trends identified by DepEd statistics.

Academic strand choice significantly impacts learning outcomes. To investigate this, a rigorous analysis of academic performance across strands is crucial. Table 5 categorizes survey respondents by their chosen academic strands, enabling a detailed examination of the relationship between strand selection and academic achievement.

Table 5. *Strand of Respondents*

<i>Strand</i>	<i>Frequency</i>	<i>Percent %</i>
ABM	11	12.80
GAS	8	9.30
HUMSS	44	51.16
STEM	23	26.74
Total	86	100

Surveyed respondents chose various academic strands as follows: 12.80% pursued ABM (11 respondents), 9.30% opted for GAS (8 respondents), 51.16% were in HUMSS (44 respondents), and 26.74% chose STEM (23 respondents). Malaga's research in 2021 highlights that a student's senior high school strand choice significantly impacts their self-regulated learning and subsequent academic performance. These diverse strand experiences prepare students for a smoother transition to college, emphasizing the importance of recognizing distinct influences on learning journeys and outcomes.

Quality Of Online Learning Modality (Qolm)

Student feedback on the Quality of Online Learning Modality (QOLM) includes three indicators: Teaching, Technology, and Online Social Interaction, each with specific factors. Michelle's (2021) findings highlight that online learning quality involves multiple factors beyond just internet-related aspects. The following tables summarize respondent experiences with online learning.

The data provides valuable insights into QOLM evaluation, covering key indicators: Teaching, Technology, and the Online Learning Environment. Mean scores and standard deviations are used for comprehensive assessment, offering insights into overall perceptions of online learning quality.

Table 6. *Level of Quality of Online Learning Modality (QOLM)*

<i>Indicators</i>	<i>Mean</i>	<i>SD</i>	<i>Description</i>
Teaching	4.79	0.45	Positive
Technological	4.43	0.69	Positive
Online Learning Environment	4.13	1.00	Positive
Average	4.45	0.71	Positive

Legend: Positive (3.41-5.00), Neutral (2.61-3.40), & Negative (1.00-2.60)

In the teaching indicator, respondents showed a high level of satisfaction with a mean score of 4.79, indicating a positive assessment. The low standard deviation of 0.45 suggests a consensus among respondents regarding teaching quality.

Regarding the technological indicator, the mean score of 4.43 indicates a positive perception of technology integration in education, though slightly lower than teaching quality. The standard deviation of 0.69 suggests some variability in opinions, reflecting differing experiences or perspectives.

Conversely, the online learning environment, with a mean score of 4.13, presents a less positive picture. Although still above a neutral midpoint, there is room for improvement. The substantial standard deviation of 1.00 indicates a wide range of experiences and opinions, highlighting the need for closer attention and potential enhancements in this aspect.

Considering all three indicators, the overall average mean of 4.45 remains positive, reflecting a generally favorable view of the educational experience. However, the average standard deviation of 0.71 underscores variability in perceptions. While teaching and technology are well-received, the online learning environment offers opportunities for refinement to ensure a more consistent and positive educational experience for all students, in line with Liu et al.'s (2022) emphasis on the importance of quality and reception in online learning best practices.

Learning Outcomes Indicated By Academic Performance

The following analysis examines the academic performance of respondents during online learning, categorized into three grading groups: "outstanding," "very satisfactory," and "satisfactory." This overview reveals a predominant trend of highly positive academic outcomes, with the majority of respondents falling within the top two categories.

A substantial 87.32% of respondents earned an "outstanding" grade (90-100) in their academic performance during online learning, reflecting exceptionally high achievement. Additionally, 8.45% of respondents received a "very satisfactory" grade (85-89), indicating favorable academic results, though in a smaller group. Furthermore, 4.23% of respondents achieved a "satisfactory" grade (80-84), signifying acceptable academic performance. In summary, the majority of respondents fell into the "outstanding" and "very satisfactory" categories, pointing to consistently positive academic outcomes during online learning.

Table 7. Academic Performance of Respondents SY (2021,2022)

Description	Grading Scale	Respondent	
		Frequency	Percentage (%)
Outstanding	90-100	62	87.32
Very Satisfactory	85-89	6	8.45
Satisfactory	80-84	3	4.23
Fairly Satisfactory	75-79	0	0.0
Did Not Meet Expectations	Below 75	0	0.0
Total		71	100.00

Regression Analysis

Table 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.893 ^a	0.873	0.829	2.65814

a. Predictors: (Constant), Quality of Online Learning Modality, Age, Gender, & Strand

b. Dependent Variable: General Weighted Average

The R-value of 0.893 signifies a strong positive correlation among the independent variables (Quality of Online Learning Modality, Age, Gender, and Strand) and the dependent variable, suggesting a significant relationship where they move together. The R Square value (0.873) indicates that about 87.3% of the dependent variable's variance can be explained by the independent variables. In simpler terms, much of the variability in the dependent variable can be predicted from the information provided by the predictor variables (Batool et al., 2023). The Adjusted R Square (0.829), which considers the model's complexity due to the number of predictors, still explains roughly 82.9% of the dependent variable's variance. This adjustment ensures the model's appropriateness. The Standard Error of the Estimate (2.65814) represents the average difference between actual and predicted dependent variable values by the regression model.

Table 9. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	175.552	4	43.888	6.211	.000 ^b
	Residual	466.335	66	7.066		
	Total	641.887	70			

a. Dependent Variable: General Weighted Average

b. Predictors: (Constant), Quality of Online Learning Modality, Age, Gender, Strand

The regression's Mean Square (43.888) significantly exceeds the Residual Mean Square (7.066), indicating that the independent variables in the model explain a substantial portion of General Weighted Average variability, and this difference is statistically significant. The p-value (0.00) is less than the common significance level ($p < 0.05$), providing strong statistical evidence against the null hypothesis (Batool et al., 2023). This suggests the regression model's statistical significance in predicting "General Weighted Average."

In summary, the ANOVA results confirm the statistical significance of the multiple regression model, including "Quality of Online Learning Modality," "Age," "Gender," and "Strand" as independent variables, in predicting "General Weighted Average." The model effectively explains a significant portion of the dependent variable's variance, and the observed differences are not likely due to chance. Hence, it serves as a valuable tool for predicting students' General Weighted Averages based on these variables.

Table 10. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision	Interpretation
	B	Std. Error	Beta				
(Constant)	77.695	10.115		7.681	.000		
Age	-0.676	0.425	-0.170	-1.592	.116	Accept H ₀₁	Not Significant
Gender	0.819	0.645	0.136	1.268	.209	Accept H ₀₂	Not Significant
Strand	-.0500	0.351	-0.155	-1.425	.159	Accept H ₀₃	Not Significant
Quality of Online Learning Modality	50.758	1.432	0.424	4.021	.000	Fail to Reject H ₀₄	Significant

a. Dependent Variable: General Weighted Average

With a regression equation of $GWA = 77.695 - 0.676(\text{Age})$, t value 7.681, and p-Value: 0.116 ($p > 0.05$), it is sound that age is not a statistically significant predictor of GWA. The p-value of 0.116 is greater than the significance level of 0.05, suggesting that age cannot predict GWA in a statistically significant manner. Therefore, it is clear to accept the null hypothesis (H₀₁), indicating that the relationship between age and level of learning outcomes through GWA is not statistically significant (Afable, 2023).

Regarding the variable of gender, with the regression equation $GWA = 77.695 + 0.819(\text{Gender})$, a t-value of 1.268, and a p-value of 0.209 ($p > 0.05$), the analysis suggests that Gender does not significantly predict GWA. The p-value of 0.209 exceeds the threshold of 0.05, indicating that Gender lacks the ability to predict GWA in a statistically meaningful manner. As a result, it is appropriate to accept the null hypothesis (H_{02}), as presented by Afable (2023) indicating that the association between Gender and level of learning outcomes through GWA lacks statistical significance.

In the case of the variable "Strand," as indicated by the regression equation $GWA = 77.695 + 0.0500(\text{Strand})$, with a t-value of -1.425 and a p-value of 0.159 ($p > 0.05$), the analysis demonstrates that Strand is not a statistically significant predictor of General Weighted Average (GWA). The p-value of 0.159 exceeds the commonly accepted significance threshold of 0.05, indicating that Strand lacks the capacity to predict GWA in a statistically meaningful manner. Consequently, it is evident that accepting the null hypothesis (H_{03}) is appropriate, suggesting that the relationship between Strand and the achieved level of learning outcomes, as measured by GWA, is not statistically significant Afable (2023).

Lastly, in the case of the variable "Quality of Online Learning Modality" (QOLM), as evidenced by the regression equation $GWA = 77.695 + 50.758(\text{QOLM})$, with a t-value of 4.021 and an impressively low p-value of 0.00 ($p < 0.05$), the analysis strongly supports the idea that QOLM holds significant statistical predictive power over General Weighted Average (GWA). The p-value of 0.00 is well below the conventional significance level of 0.05, clearly indicating that QOLM possesses the capacity to predict GWA in a highly statistically meaningful manner. Consequently, it is entirely justified to "fail to reject" the null hypothesis (H_{04}), affirming that the relationship between QOLM and the level of learning outcomes, as represented by GWA, is indeed statistically significant.

In summary, this analysis concludes that Age, Gender, and Strand are not statistically significant predictors of General Weighted Average (GWA). These variables do not have a substantial impact on GWA, as indicated by their p-values exceeding the significance level. However, the Quality of Online Learning Modality (QOLM) is a statistically significant predictor of GWA, as its p-value is below the significance level. This suggests that the quality of the online learning modality has a significant influence on students' attainment of learning outcomes as indicated by their GWA (Moore 2023).

Thematic Analysis

In the evolving landscape of online education, the text delves into several grand themes that shaped the success and challenges of online learning. These themes encompass successful teaching strategies, virtual interaction and community building, effective communication, teacher presence and engagement, challenges of online education, technology and learning platforms, and the critical influence of the home learning environment. Let's explore these themes in greater detail.

Successful Teaching Strategies:

This theme underscores the importance of effective teaching methods in the context of online education. The text mentions that teachers at Lyceum of Cebu, Inc.-Barili Campus employed variation and flexibility in their teaching methods.

Student 1 described,

"Our teachers, especially our English teacher is really good at explaining confusing grammar rules...He provide lots of interactive games that can be accessed in our zoom classes. Sometimes we have peer activities, groupings and others..."

This flexibility and adaptability are crucial in keeping students engaged and catering to their diverse needs. The theme suggests that successful online teaching involves innovation and a willingness to adjust instructional approaches.

Virtual Interaction and Community Building:

The text highlights the role of regular virtual discussions in fostering interaction among students, promoting accountability, and creating a sense of community.

Student 5 elaborated,

"Always jud mi magklasi. Kung naa man gani times nga dili maka klasi naay additional tasks nga among buhaton by team. So mag VC nalang mi para sa amoang mga buhatunon para e-present inig next zoom meeting..."

This theme emphasizes that building a supportive online learning community is essential for student success in remote education. It also suggests that technology can be leveraged to facilitate social interaction in an online learning environment.

Effective Communication:

Proactive communication from teachers is mentioned as a strategy to reduce confusion and enhance the overall online learning experience.

Student 7 related,

"If there are times nga dili ko ka attend sa class, most of the time mo chat jud among adviser, then mo inform pud sa among parents

nganong wala ko nakasulod sa class. For clarification of the discussions mo chat mi sa among teachers mag send jud sila ug mga references or videos para amoa jud masabtan...”

This theme emphasizes the importance of clear communication and support from instructors. It suggests that effective communication can mitigate some of the challenges associated with online education, such as students feeling isolated or disconnected.

Teacher Presence and Engagement:

Teacher presence, demonstrated through well-prepared presentations, is highlighted as a factor that boosts student engagement and combats the isolation of online learning.

Student 1 responded,

“During our zoom classes, our subject teachers prepare power point presentations and discuss the lessons in detail. Also, during the class, our teachers will ask us to provide our examples, perform drills...”

This theme emphasizes that teachers play a critical role in online education and that their active involvement can significantly impact students' learning experiences.

Challenges of Online Education:

The text acknowledges challenges such as internet connectivity issues and geographic limitations, which can hinder some students' access to online education.

Student 8 described,

“Diri sa among lugar hinay man kaau ang internet, usahay sa usa ka week maka sulod ko ug ka tulo unya ang uban pud putol-putol. Mao nga adto nalang ko sa GC or google classroom para maka-access sa presentation unya answeran ang mga tasks...”

This theme underscores the disparities and obstacles that exist in the online learning landscape, particularly for students in underserved areas.

Technology and Learning Platforms:

Efficient gadgets and learning platforms are mentioned as receiving positive feedback for supporting online learning.

Student 10 elucidated,

“Our gadgets can support long zoom discussions, and during our lessons in gen. math we use the zoom board so that we can see the solutions...”

This theme highlights the importance of having the right technological tools and platforms in place to facilitate effective online education. It suggests that technology can be an enabler of remote learning success.

Home Online Learning Environment:

The text discusses three key themes related to the Home Online Learning Environment: parental support, a distraction-free environment, and improved socialization and collaboration.

Student 9 described,

“Most of the times when I don't feel like joining the online classes, my father always checks on me whether I attended or not, so father informs our adviser so I can catch-up with the lessons...”

Student 3 presented,

“I attend zoom discussions in my room which is walay saba and distractions...”

Student 6 replied,

“During groupwork, gikan kay wala kaau distractions sa balay maka VC ko sa akoang mga groupmates para mag-tabi mi unsay among buhaton sa among mga projects, activities...”

These themes emphasize the importance of creating conducive home environments for online learning, where students receive support from parents, have a space free from distractions, and can engage with peers.

In summary, the text addresses various grand themes related to online education, including effective teaching strategies, building a sense of community, communication, teacher engagement, challenges, technology's role, and the home learning environment. Each of these themes contributes to a comprehensive understanding of the dynamics and factors influencing the success of online education.

Triangulation

The data collected, both quantitatively and qualitatively, has provided valuable insights and conclusions that are presented in the table below. These conclusions are the result of a thoughtful analysis of the information gathered through these research methods. Importantly, each method brings its own unique strengths to the research, allowing the researcher to establish causality relationships among the variables presented via triangulation.

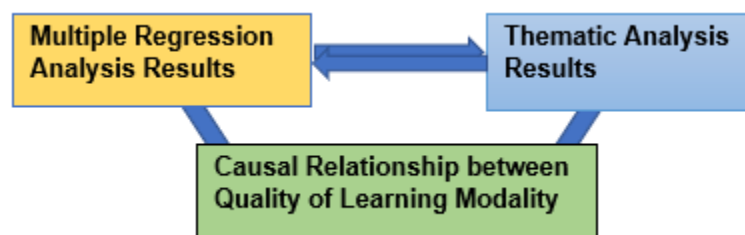


Figure 1. *Triangulation Framework*

The combination of multiple regression analysis and thematic analysis reveals a strong causal link between online learning modality quality and academic performance.

Multiple regression analysis, specifically the "failure to reject H_0 ," provides robust statistical evidence supporting the significant relationship between online learning quality and academic achievement. This finding underscores that variations in online learning quality directly impact students' academic success, forming a crucial foundation in understanding this relationship.

Complementing this statistical evidence, thematic analysis of Lyceum of Cebu, Inc.-Barili Campus' online classes uncovers practical aspects of this connection. Successful teaching strategies, teacher adaptability, and proactive communication demonstrate how a high-quality online learning environment positively affects learning outcomes. Factors like parental support, a conducive home environment, and enhanced socialization further reinforce the role of online learning quality in academic performance.

However, challenges like internet connectivity and geographical limitations persist, hindering access to quality online learning. This emphasizes the need to address infrastructure and access issues to ensure equitable access to the benefits of a quality online learning environment.

In summary, the integration of multiple regression and thematic analysis provides a comprehensive view of the causal relationship between online learning quality and academic performance. Statistical evidence confirms this link, while thematic analysis sheds light on practical aspects and contributing factors, emphasizing the importance of a well-designed online learning environment for fostering positive educational outcomes.

Conclusion

Both statistical analysis and thematic exploration unequivocally reveal that factors like Age, Gender, and Strand lack statistical significance in predicting academic performance (as measured by General Weighted Average or GWA). Conversely, the Quality of Online Learning Modality (QOLM) emerges as a robust predictor, emphasizing its pivotal role in shaping student outcomes.

The thematic analysis complements these findings by highlighting the synergy between effective teaching strategies and a high-quality online learning environment, enhancing student engagement and accountability through adaptability, diverse instructional methods, virtual discussions, and proactive communication.

Additionally, the thematic analysis uncovers key factors within the home online learning environment, including the importance of parental support, creating a distraction-free study space, and fostering socialization and collaboration. These elements significantly influence the overall quality of the online learning experience and its impact on academic performance.

In summary, the combined evidence confirms that Age, Gender, and Strand are not significant predictors of academic performance, while QOLM stands out as a robust predictor. The thematic analysis underscores the symbiotic relationship between effective teaching strategies and a high-quality online learning environment while highlighting the importance of the home learning environment. Together, these insights provide a holistic understanding of online education.

Based on the research findings that highlight the significant influence of Quality of Online Learning Modality (QOLM) on students' learning outcomes, several recommendations emerge for various stakeholders. School administrators should consider enriching scaffold supervisory strategies, investing in high-quality online learning platforms, addressing technology disparities, providing professional development for teachers, and regularly assessing and improving online learning modalities while promoting flexibility in teaching and communication.

Teachers should focus on promoting regular communication, receiving online pedagogy training, employing effective engagement

strategies, facilitating virtual community building, offering constructive feedback, ensuring accessibility, and encouraging parental involvement.

Parents can contribute by creating supportive home learning environments, enhancing communication with teachers and students, improving tech literacy, maintaining a balanced approach to online learning, and advocating for their children's educational needs.

Students can enhance their online learning experience by establishing dedicated learning spaces, adhering to consistent schedules, staying engaged during online classes, proactively communicating with instructors and peers, utilizing online resources, joining virtual study groups, practicing time management, minimizing distractions, seeking technical support when needed, engaging in self-assessment, connecting with peers, attending webinars and workshops, and utilizing academic support services.

Finally, for future researchers, it is recommended to focus on research related to teaching effectiveness, conduct longitudinal studies, engage in comparative analysis, explore inclusivity in online education, assess the impact of teacher training, and investigate emerging technologies to further advance the field of online learning.

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