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Contextualized Instructional Sheet (CIS) as Intervention Material in Mathematics 8 to Improve Students' Academic Performance

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ABSTRACT

This quasi-experimental study investigated the effectiveness of Contextualized Instructional Sheets (CIS) as an intervention material in improving the academic performance of eighth-grade learners in Mathematics. Two groups of eighth-grade learners participated in the study, with one group as the control group and the other as the experimental group. The control group did not have exposure to CIS, while the experimental group used CIS. Data were collected through a researcher-made survey questionnaire and a 40-item pre-test and post-test based on the third quarter's most essential learning competencies (MELCs). The perception of the respondents regarding CIS was analyzed using mean and standard deviation, while the pre-test and post-test scores were analyzed using frequency and percentage. The dependent t-test was used to determine the significant difference between the pre-test and post-test scores of the two groups, while the independent t-test was used to compare the pre-test scores of the two groups and the post-test scores of the two groups. The use of CIS had a significant impact on the academic performance of the learners which was indicated in a statistically significant difference between the pre-test and post-test scores of the control group, with the post-test scores being significantly higher. These findings suggest that CIS can be an effective intervention material for improving the academic performance of eighth-grade learners in Mathematics. The study recommends the wider implementation of CIS based on its positive impact on learners' academic achievement.

Keywords: Contextualized instructional sheet, intervention material, academic performance

INTRODUCTION

In a world where mathematics is hailed as the universal language (Helmenstine, 2019), the educational landscape faces a challenge reflected in the dismally low achievement levels of students in this crucial discipline, as highlighted by the results of the Program for International Student Assessment (PISA) 2018. Mathematics, often perceived as a complex and abstract discipline with broad applications, demands a paradigm shift in teaching and learning approaches. The integration of mathematical concepts into real-world contexts becomes imperative for meaningful and relevant education, fostering learning transfer through contextual teaching methods (Madrazo & Dio, 2020).

The onset of the COVID-19 pandemic prompted an unprecedented shift in educational delivery methods, leading the Department of Education (DepEd) in the Philippines to swiftly implement Modular Distance Learning (MDL) as an urgent response to ensure the continuity of education. As the nation adapts to this

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new normal, the dynamic landscape of education demands continuous innovation from educators and active collaboration from stakeholders (Dangle & Sumaoang, 2020). However, this transition to distance learning has unveiled challenges, particularly in the field of mathematics, where students grapple with the intricacies of the subject without the traditional classroom support.

In response to the evolving situation, San Cristobal Integrated High School (SCIHS) took proactive measures to address the issues arising from the first implementation of Modular Distance Learning Modality (MDL) in the printed mode. Recognizing the low retrieval rates and challenges faced by learners, SCIHS introduced the Contextualized Instructional Sheets (CIS) as an intervention material in Mathematics. CIS, a detailed guide personally prepared and contextualized by teachers, aims to bridge the gap created by the absence of classroom instruction during the MDL printed mode. This research explores the extent to which CIS improves the academic performance in Mathematics and serves as the basis for wider implementation in public schools transitioning from distance learning to full in-person classes for the school year 2022-2023.

This research is grounded in the recognition of the global learning crisis highlighted by the World Bank's Learning Poverty indicator and the need to intensify the teaching-learning process (Saavedra, 2020). The Philippines' rankings in international assessments underscore the urgency for effective pedagogical strategies, especially in subjects like mathematics (Tadalan, 2021).

The theoretical framework underpinning this research is rooted in several key educational theories, namely Constructivism, Situated Cognition, and Social Cognitive Theory. These theories collectively inform the development and application of Contextualized Instructional Sheets (CIS) in the context of mathematics education during the transition from Modular Distance Learning (MDL) to in-person classes in the Philippines.

Constructivism, as proposed by Vygotsky (1980), highlights the active role of learners in constructing their knowledge through experiences and interactions. The application of this theory in CIS involves creating learning experiences that allow learners to connect new information to their existing knowledge and experiences. By providing real-life examples and problems relevant to the learners' lives, CIS facilitates the construction of meaningful connections between the material and their own contexts, thereby promoting deeper understanding and learning transfer.

Situated Cognition, as articulated by Lave and Wenger (1991), posits that knowledge is best acquired and retained when learned in the context in which it will be used. In the CIS framework, situated cognition is applied by designing learning experiences situated in real-world contexts such as the school and community. This approach ensures that learners can easily understand and apply the materials because they have firsthand experience in the contexts where the knowledge is intended to be utilized. Situated cognition contributes to the effectiveness and meaningfulness of the learning experiences provided by CIS.

Social Cognitive Theory, as proposed by Bandura (1986, 2001), emphasizes the role of social interactions and observational learning in knowledge and skill development. In the CIS framework, this theory is operationalized by creating opportunities for learners to interact with individuals possessing expertise in the studied area, such as teachers and peers. By observing, interacting, and receiving assistance from knowledgeable others, learners can develop a deeper understanding of the material and recognize its relevance to their lives. The collaborative and social nature of learning, as facilitated by CIS, aligns with the principles of Social Cognitive Theory.

The theoretical framework of this research underscores the significance of creating a learning environment that is relevant, meaningful, and situated in real-world contexts. By embracing Constructivism, Situated Cognition, and Social Cognitive Theory, the study aims to explore the extent to which the implementation of Contextualized Instructional Sheets improves the academic performance in Mathematics of learners

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during the transition from Modular Distance Learning to full in-person classes in the academic year 2022-2023.

Objective of the Study

The study seeks to explore the extent to which the CIS enhances the academic performance of learners in mathematics during the transition from distance learning to full in-person classes for the school year 2022-2023. Through this research, it aims to contribute valuable insights that can inform educational practices and strategies to foster effective mathematics learning in a rapidly evolving educational landscape.

To assess the perceived effectiveness of Contextualized Instructional Sheets (CIS) among students, focusing on the dimensions of contextualization, values integration, acceptability, and accessibility. This aims to understand how students perceive CIS in terms of its contextual relevance, integration of values, acceptance as an instructional tool, and ease of access. By evaluating these dimensions, the study seeks to gauge the overall effectiveness of CIS as an intervention material in enhancing Mathematics performance among learners.

Understanding the student's perspective will contribute to the broader discussion on the relative advantages and challenges of implementing contextualized instructional materials in the educational context.

RELATED WORK

Contextualization. The literature reviewed herein emphasizes the importance of contextualization and localization in education, particularly within the framework of the Philippine educational system. The adoption of DepEd Orders, such as No. 35 s.2016 and No. 21 s.2019, highlights a concerted effort to enhance student learning outcomes through deliberate measures at the school level.

Wang, Sun, and Wickersham (2017) stress the motivational benefits of contextualization, asserting that relevant and real subject matter diminishes learners' apprehensions and enhances understanding. Margana (2015) extends this concept with a focus on the localization approach, wherein teachers integrate the tradition, locality, and culture of students into assessment and instruction, connecting curriculum content to the learners' community.

The research of Rivera and Sanchez (2020) reveals that exposure to contextualized instructional materials significantly improves student performance compared to conventional learning materials. Policarpio (2018) and Dimacali (2018) delve into the localization process, highlighting the transformation of curriculum to local learning content and the freedom schools have in meeting the unique needs of their learners. Mahabadi (2012) and Salviejo et al. (2014) emphasize the role of localized materials in valuing cultural and social identities, contributing to a successful teaching and learning interplay.

Tulgar (2018) and Tomlinson (2011) underscore the connection between teachers' education, mother tongue, and intercultural interactions in preserving local culture through the development of localized learning materials. Sorcar et al. (2017) and Garin et al. (2017) provide evidence that using localized materials improves student learning outcomes, particularly in community-based instructions.

The findings of Reyes et al. (2019), Egcas et al. (2017), and Bulusan (2019) further corroborate the positive impact of localized curriculum on student engagement, understanding, and motivation. Creus (2019) emphasizes the high performance and career development opportunities facilitated by localization, while Esselink (2000) defines localization as making products linguistically and culturally appropriate for the target locale. The importance of curriculum localization is further reiterated by Castillo (2019) and UNESCO International Bureau of Education, emphasizing its significance in making learning more

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meaningful and pertinent. Manuel (2018) reinforces the success of contextualization and localization in delivering lifelong learning objectives and improving student performance across disciplines.

Finally, Lorbis (2019) concludes that honing knowledge and skills through contextualized teaching, accompanied by the development of contextualized learning materials, makes learning more meaningful and relevant to learners. The legislative framework, as evidenced by RA 9155, supports local efforts to enhance the quality of basic education and reflects the characteristics, requirements, and ambitions of the learning environment.

Values Integration. The integration of values into education has been a consistent focus, with policies such as DepEd Order No. 41, S. 2003 emphasizing the crucial role of values education teachers in aiding other subject area teachers to integrate values development across disciplines. This collaborative effort ensures that values become an integral part of every teacher's responsibility, as suggested by Sumbi Jr. (n.d).

Azis (2014) and Nagahama (2014) highlight the challenges of integrating values into subjects like mathematics and economics, emphasizing the need for teachers to be knowledgeable about the values to be integrated and how to develop them. The importance of conveying values through various subjects is echoed by Hadi (2015), who emphasizes the effectiveness of teaching values through other subjects where teachers are already well-versed in their specializations.

Taplin (2020) emphasizes the role of problem-solving in teaching mathematics as a means to incorporate character values. The idea is that engaging students in problem-solving not only enhances mathematical skills but also fosters essential life skills and values. Nurhajarurahmah et al. (2021) further emphasize the benefits of learning mathematics, including the development of communication skills and the ability to justify decisions.

Suyitno et al. (2020) suggest incorporating character values into the learning process by embedding them into command, exemplary, and governmental questions in mathematics. They argue that character education is crucial for developing excellent behavior in a multicultural society and fostering global peace.

Role (n.d) addresses the challenge of integrating values into mathematics, stating that careful study is required to identify opportunities without making the connections seem artificial. The exploration and development of values as an objective of mathematics education are deemed a timely goal.

Furthermore, the importance of character education is underscored by Zhuojun & Robert (2018), emphasizing the need for cooperation between the family, school, learning environment, and the larger community. Teachers, according to Hadi (2015), should receive additional training in character education to enhance the effectiveness of integrating values into their disciplines, requiring creativity on their part.

Evasco's (2015) study on the integration of values in the teaching of social sciences provides evidence that values integration primarily occurs during discussions and varies based on the lesson, emphasizing the centrality of socialization and the "others" centered approach in social sciences education.

Acceptability. The significance of instructional materials in influencing learning outcomes has been a consistent theme in educational research. Smith and Johnson (2018) emphasize that well-designed, user-friendly materials that align with course objectives positively impact learning outcomes. Terano (2015) expands on this idea, measuring the acceptability of instructional materials through objectives, content, and presentation style, particularly in the context of Differential Calculus for Engineering.

Mathew (2012) and Kochhar (2012) both assert that instructional materials enhance teaching effectiveness and encourage active participation among learners. Olayinka (2016) acknowledges the role of instructional

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materials in aiding explanations and making subject matter understandable during the teaching-learning process. Koko (2015) underscores the importance of developed instructional materials as tools for effective teaching and learning.

Teacher preferences play a crucial role in the acceptance and use of instructional materials. Brown and Davis (2019) note that teachers favor visually appealing materials that are well-organized, provide clear explanations, and offer relevant examples. Galicha and Lazaro (2022) emphasize that excellent supplementary learning materials must possess adequacy, clarity of content, objectives, suitability, and usefulness.

Rodriguez (2023) identifies key criteria for effective task-based supplementary instructional materials, including instructional design, organization, quality, assessment, format, and presentation. Quisumbing et al. (2017) stress that the development of effective instructional materials is designed to enrich student learning. Adbu-Raheem (2011) advocates for the improvisation of local and simple instructional materials by teachers to uplift academic standards. Bhat (2012) highlights the importance of suitable supplementary materials for students to enhance the learning process.

Brown (2009) notes that instructional materials enable teachers to accomplish tasks that might be challenging without such resources, providing concepts and practices through text and diagrams. Pappas (2020) introduces the concept of a learning module, describing it as a self-contained package of activities that help learners understand or achieve specific learning objectives.

Espinar and Ballado (2016) bring attention to the features of an acceptable worktext, emphasizing that it must be accepted by both teachers and learners. A good worktext, according to them, should enhance the teaching-learning process through clear, simple, and easy-to-understand lessons, activities, and exercises, containing adequate and sufficient information suitable for its intended learners.

Accessibility. The importance of instructional resources and accessibility in effective teaching and learning is a recurring theme in educational research. Odinakachi et al. (2023) stress that teaching without instructional resources is ineffective, emphasizing the need for teachers to maximize available materials. Accessibility, defined as the degree to which resources are available to all users, including those with disabilities, is considered crucial in inclusive education (Education Links, 2020).

Price (2006) notes the significance of visual representations in instructional materials, highlighting that students often find materials with visual elements more accessible than ‘text-only’ versions. Price (2018) further elaborates on key features of accessibility, including content organization, presentation in multiple formats, strategic content presentation, user choices, hypermedia support, information provision, collaboration opportunities, and assistive technologies.

The concept of accessibility extends beyond materials to the use of products, services, frameworks, or resources by individuals with different abilities (ISO 9241-171, 2008), providing benefits for diverse learners (Henry et al., 2016). McGowan (2018) emphasizes the importance of environment accessibility in an era where online learning and web communication are prevalent.

Saunders and Wong (2020) highlight the advantages of written materials being more accessible online, allowing students to manipulate text size and brightness, using electronic gadgets for an enhanced learning experience. Teachers are encouraged to provide materials in multiple formats, use diverse classroom activities, and allow various ways for students to demonstrate understanding (Education Links, 2020).

Suprihatiningrum (2022) emphasizes the teacher’s role in providing inclusive pedagogy, content, and technology to cater to diverse learners. Accessible educational resources, including specialized formats like

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audio, Braille, eText, and big print, are deemed necessary for students with impairments (AEM).

Academic Performance. Moving beyond the realm of resources, academic performance is a key concern in education. The use of pretests and posttests as diagnostic tools for effective teaching is emphasized by Kuehn (2017), Goldman (2014), Danielson (2017), and Morisson (2010). McTighe (2016) introduces pre-assessments as tools for determining students' knowledge, skills, or dispositions before instruction, aiding teachers in planning and assessing learning progress.

Factors influencing academic performance are multifaceted, including student and teacher attitudes, instructional strategies, classroom atmosphere, gender stereotypes, and family influences (Ayebale et al., 2020). Parental education and expectations also play a crucial role in predicting students' achievement (Brew et al., 2021).

The role of teachers in improving educational outcomes is discussed by various authors. While Brew et al. (2021) highlight the impact of teacher inefficiency on student education, Bello et al. (2023) and Dioneda Jr. (2019) emphasize the positive effects of contextualization and localization in the teaching and learning processes.

METHODOLOGY

This chapter outlines the methodology employed in the study, encompassing the research design, respondents, sampling technique, research instruments, research procedure, and statistical treatment of data.

Research Design

The study utilized a quasi-experimental research design, specifically a between-group pre-test-post-test design. This design was chosen to assess the effectiveness of contextualized instructional sheets (CIS) in enhancing the academic performance of Grade 8 students. The quasi-experimental design, as defined by Cook and Campbell (1979), was selected due to the non-random assignment of participants to conditions or order of conditions.

Respondents of the Study

The population for this study consisted of 178 Grade 8 students from San Cristobal Integrated High School. Respondents were grouped into four sections to maintain heterogeneity and avoid sharing CIS within sections.

Sampling Technique

Total population sampling was employed, including all Grade 8 students, with two sections designated as the controlled group and the remaining two as the experimental group. The experimental group utilized the CIS, while the controlled group underwent conventional teaching methods.

Table 1: Distribution of Respondents

	Male	Female	Total
Experimental	45	44	89
Controlled	44	45	89

Research Instruments

Contextualized Instructional Sheet (CIS): Developed by the researcher, the CIS served as the intervention

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material, containing discussions, explanations, and examples based on the intended Mathematics Essential Learning Competencies (MELC) for the third quarter.

Survey Questionnaire: A Likert Scale-based questionnaire was employed to gauge respondents' perceptions regarding CIS in terms of contextualization, values integration, acceptability, and accessibility.

Pre-Test and Post-Test: A 40-item test, aligned with the third quarter MELC in Mathematics 8, served as a measure of academic performance. The pre-test established baseline performance, while the post-test assessed performance after CIS implementation.

Research Procedure

Instrument Validation: The survey questionnaire and tests were validated by professionals to ensure reliability and validity. Cronbach Alpha Analysis and Kuder Richardson Formula 20 were used for the survey questionnaire and tests, respectively.

Pilot Testing: A pilot test with 15 respondents, not included in the study, was conducted to identify and rectify confusing or biased questions. Cronbach Alpha Analysis and Kuder Richardson Formula 20 were applied for validation.

Data Collection: Permission was obtained from school leaders, and parental consent was secured for student participation. The instruments were then distributed, retrieved, and tabulated.

Statistical Treatment of Data

Perception Analysis: Frequency, percentage, mean, and standard deviation were used to analyze respondents' perceptions.

Academic Performance Analysis: Independent T-Test compared pre-test and post-test scores between controlled and experimental groups. Dependent T-Test compared pre-test and post-test scores within each group.

Significance Level: A 0.01 significance level was employed for all statistical tests. Independent T-Test compared unrelated groups, while Dependent T-Test compared related groups.

This comprehensive methodology aimed to rigorously evaluate the impact of contextualized instructional sheets on the academic performance of Grade 8 students, ensuring robustness and validity in the research process.

RESULT AND DISCUSSION

Table 2 Perception of the Respondents in Contextualized Instructional Sheet in terms of Contextualization

Indicators	Mean	SD	Verbal interpretation
The Contextualized instructional sheet (CIS)… 1. provides a variety of learning opportunities such as visual aids, interactive elements and hands-on activities.	3.45	0.50	Agree
2. uses appropriate language and terminology for me to easily understand the lesson presented.	3.49	0.50	Agree

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3. Tagalog discussion helps me better understand the lesson presented.	3.80	0.40	Strongly agree
4. presents examples and situations familiar to me.	3.33	0.52	Agree
5. uses easy to understand words to explain the lesson.	3.58	0.50	Strongly agree
Overall Mean	3.53	0.30	Strongly agree

Legend: 3.50 – 4.00 Strongly agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; 1.00 – 1.49 Strongly disagree

The respondents' strong agreement on the contextualization of the CIS, as indicated by the overall mean of 3.53, aligns with existing literature on effective instructional design principles. Contextualization is acknowledged for its role in providing relatable examples within the community, aiding learners in understanding text, and establishing relevance to their background (Reyes et al., 2019; Egcas et al., 2017; Bulusan, 2019).

The highest agreement scores in indicators 3 and 5, where respondents strongly agree that the CIS utilizes easy-to-understand words and Tagalog discussions enhance their understanding, emphasize the significance of language and cultural relevance in educational materials. This resonates with research suggesting that incorporating familiar language and discussions in the native language positively influences comprehension and engagement (Egcas et al., 2017).

While the respondents generally agreed on indicators 1, 2, and 4, there is a nuanced perspective on the variety of learning opportunities, language usage, and presentation of examples. The respondents agreed but not strongly, suggesting room for improvement in these aspects. Further investigation into specific preferences and expectations could offer insights into refining these elements of contextualization.

The study suggests that the CIS, with its contextualization features, has been positively received by the respondents. The emphasis on language, relatable examples, and cultural relevance has contributed to a strong agreement regarding contextualization. The nuanced responses in certain indicators open avenues for iterative improvements to better cater to the varied preferences and expectations of the learners. This study lays the groundwork for the ongoing development of instructional materials that align with learners' perceptions and contribute to enhanced educational experiences.

Table 3 Perception of the Respondents in Contextualized Instructional Sheet in terms of Values Integration

Indicators	Mean	SD	Verbal interpretation
1. There is "Make My Day" and words of encouragement in every issue of CIS.	3.46	0.52	Agree
2. The values I learned in every issue of CIS is coherent to our lesson.	3.55	0.52	Strongly agree
3. The CIS provides me activities to practice the values I learned.	3.54	0.50	Strongly agree
4. I conquer my fear in Math because CIS make the lesson easy to understand.	3.46	0.52	Agree
Overall Mean	3.50	0.36	Strongly agree

Legend: 3.50 – 4.00 Strongly agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; 1.00 – 1.49 Strongly disagree

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The respondents' strong agreement on values integration in the CIS, with an overall mean of 3.50, underscores the significance of incorporating values into instructional materials. This aligns with existing literature emphasizing the effectiveness of values integration across subjects (Hadi, 2015). The study affirms that values integration is a crucial aspect of the instructional design, contributing to a holistic learning experience.

The strongest agreement in indicators 2 and 3, where respondents strongly agree that the CIS has values integration, highlights the positive impact of the CIS on the coherence of learned values with lessons. The emphasis on practice activities aligns with the research suggesting that practical application reinforces the internalization of values (Evangelista, 2006).

While the respondents generally agreed on indicator 1, signifying the presence of "Make My Day" and words of encouragement, there is room for improvement. The agreement, though not strong, indicates a positive acknowledgment, but addressing specific aspects of this integration may enhance its effectiveness.

In indicator 4, where respondents agree that the CIS helps conquer their fear in Math, the positive perception signifies the potential of instructional materials to influence students' emotional aspects positively. However, the agreement level suggests that further enhancements or clarifications may be needed to strengthen the perceived impact.

The study demonstrates that the CIS is perceived positively regarding its values integration. The strong agreement on coherence, practical application, and fear-conquering aspects indicates the potential of instructional materials not only to impart academic knowledge but also to influence students' values and emotions. This study lays the foundation for continued exploration of values integration in educational materials, fostering a more comprehensive and impactful learning environment.

Table 4 Perception of the Respondents in Contextualized Instructional Sheet in terms of Acceptability

Indicators	Mean	SD	Verbal interpretation
1. The content of the CIS is within the context of my comprehension.	3.24	0.58	Agree
2. The content of the CIS is logically arranged and accurate.	3.57	0.50	Strongly agree
3. The content of the CIS is aligned in subject matter and most essential learning competency.	3.42	0.50	Agree
4. The content of the CIS is aligned with the objective of the lesson.	3.48	0.50	Agree
5. The CIS uses variety of media such as images, illustrations and interactive activities that enhance my motivation and interest.	3.54	0.50	Strongly agree
Overall Mean	3.45	0.32	Agree

Legend: 3.50 – 4.00 Strongly agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; 1.00 – 1.49 Strongly disagree

The results show that the respondents strongly agree on certain aspects of the CIS's acceptability. Notably, the logical arrangement and accuracy of content received a high mean score of 3.57, indicating that the respondents find the material well-structured and reliable. Additionally, the use of a variety of media to enhance motivation and interest garnered a strong agreement (mean = 3.54), suggesting that incorporating diverse media elements contributes positively to the learning experience.

The positive perceptions regarding logical arrangement, accuracy, and the use of media are strengths that can be leveraged in future instructional designs. To address areas for improvement, incorporating more real-life examples and scenarios relevant to the respondents' context may enhance comprehension and

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alignment. Continuous feedback from the users, coupled with periodic evaluations, can inform iterative improvements to ensure that the CIS remains a highly acceptable and effective instructional tool.

The acceptability of the CIS is acknowledged by the respondents, emphasizing its strengths and revealing areas for refinement. This study contributes valuable insights into the design and improvement of instructional materials, fostering an environment where learners find the material both accessible and conducive to their learning needs.

Table 5 Perception of the Respondents in Contextualized Instructional Sheet in terms of Accessibility

Indicators	Mean	SD	Verbal interpretation
1. The CIS is distributed in printed format.	3.81	0.40	Strongly agree
2. I can access the CIS anytime either in digital or printed format.	3.19	0.42	Agree
3. I can install the CIS in my mobile device.	3.16	0.54	Agree
4. The CIS provides clear explanations of concepts.	3.48	0.50	Agree
5. The CIS has clear format to aid navigation.	3.37	0.51	Agree
Overall Mean	3.40	0.26	Agree

Legend: 3.50 – 4.00 Strongly agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; 1.00 – 1.49 Strongly disagree

Table 5 presents the respondents' perception of the Contextualized Instructional Sheet (CIS) in terms of accessibility. The overall mean of 3.40, with a standard deviation of 0.26, suggests that the respondents generally "agree" that the CIS is accessible. This aligns with the idea that educational materials should be presented in various formats and allow flexibility in access and understanding (Education Links, 2020).

This nuanced response suggests that while the majority of respondents agree that the CIS is generally accessible, there are specific aspects where their conviction is less strong. It is noteworthy that the respondents are not entirely convinced about accessing the CIS in both digital and printed formats, indicating potential room for improvement in ensuring the availability of diverse access options.

The literature supports the importance of providing educational materials in multiple formats, accommodating different learning styles (Education Links, 2020). The use of digital formats, particularly on mobile devices, is highlighted as an accessible means, allowing learners to manipulate the material to suit their needs (Saunders and Wong, 2020).

To enhance accessibility, educators might consider reinforcing the benefits of digital access, addressing concerns expressed in Indicators 2, 3, 4, and 5. Additionally, providing clearer explanations of concepts and improving the format for better navigation could further enhance the overall accessibility of the CIS.

The respondents generally perceived the CIS as accessible, with a strong affirmation regarding its distribution in printed format. However, attention to specific aspects highlighted in the survey could contribute to a more robust and universally accessible instructional experience for the respondents. Future iterations of the CIS may benefit from incorporating these insights to better cater to the diverse needs of the learners.

Table 6 Pretest Scores of the Respondents in the Controlled and Experimental Groups

Scores	Controlled			Experimental		
	F	Percent	Verbal interpretation	f	Percentage	Verbal interpretation
31 – 40	0	0.00	High mastery	0	0.00	High mastery

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21 – 30	3	3.37	Average mastery	6	6.74	Average mastery
11 – 20	61	68.54	Low mastery	52	58.43	Low mastery
1 -10	25	28.09	Very low mastery	31	34.83	Very low mastery
0	0	0.00	No mastery	0	0.00	No mastery
Total	89	100.00		89	100.00	

Table 6 provides an overview of the pretest scores of respondents in both the controlled and experimental groups, offering insights into their initial academic performance before any intervention. The pretest scores serve as a baseline measure of students' knowledge, skills, or dispositions before the introduction of the Contextualized Instructional Sheet (CIS) intervention.

Notably, the absence of respondents in the "high mastery" category for both groups indicates that none of the participants demonstrated a high level of knowledge on the pre-test content. This suggests a consistent baseline where students, regardless of group assignment, had limited prior knowledge of the covered material.

Similarly, the absence of respondents in the "no mastery" category implies that all participants had some level of familiarity with the pre-test content. This indicates that the respondents possessed at least a foundational understanding of the topics covered, aligning with the purpose of the pretest as a measure of existing knowledge before formal instruction.

The majority of respondents in both groups fall into the "low mastery" and "very low mastery" categories. This clustering suggests that, while students had some prior knowledge of the pre-test content, it was limited. The lower mastery levels could be attributed to the fact that the material had not yet been taught, discussed, or introduced to the participants.

These findings underscore the importance of considering the initial knowledge levels of students when implementing educational interventions. McTighe (2016) emphasizes the significance of pre-tests in gauging students' baseline understanding before the commencement of formal instruction. In this context, the pretest scores serve as a benchmark against which the impact of the subsequent CIS intervention can be assessed.

The relatively balanced distribution of respondents across the "low" and "very low mastery" levels in both groups indicates a similar starting point for both controlled and experimental groups. As the study progresses, comparing the post-intervention scores will provide valuable insights into the effectiveness of the CIS in enhancing students' mastery of the subject matter.

The pretest scores revealed a consistent baseline of limited prior knowledge among participants, setting the stage for the CIS intervention. As the study advances, the impact of the instructional sheet on academic performance can be assessed by comparing post-intervention scores against these initial pretest scores, providing a comprehensive understanding of the intervention's effectiveness in improving students' mastery of the material.

Table 7 Posttest Scores of the Respondents in the Controlled and Experimental Groups

Scores	Controlled			Experimental		
	F	Percent	Verbal interpretation	f	Percentage	Verbal interpretation
31 – 40	5	5.62	High mastery	15	16.85	High mastery
21 – 30	42	47.19	Average mastery	52	58.43	Average mastery

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11 – 20	41	46.07	Low mastery	22	24.72	Low mastery
1 -10	1	1.12	Very low mastery	0	0.00	Very low mastery
0	0	0.00	No mastery	0	0.00	No mastery
Total	89	100.00		89	100.00	

Table 7 provides an in-depth analysis of the posttest scores of respondents in both the controlled and experimental groups, showcasing the mastery levels achieved in essential learning competencies following the intervention. The mastery levels are categorized into “High Mastery,” “Average Mastery,” “Low Mastery,” “Very Low Mastery,” and “No Mastery.”

In the controlled group, 5 respondents (5.62%) attained “High Mastery,” signifying a strong command of the specified learning competencies. This indicates that conventional teaching methods led to a notable achievement of high mastery levels in the controlled group. Conversely, in the experimental group, the implementation of the Contextualized Instructional Sheet (CIS) resulted in 15 respondents (16.85%) reaching the “High Mastery” level. This demonstrates the positive impact of the intervention, surpassing the conventional teaching approach in fostering a deeper understanding of the learning competencies.

A substantial portion of the controlled group (47.19%) falls into the “Average Mastery” category, indicating that these respondents mastered most of the learning competencies. In comparison, the experimental group outperforms, with 58.43% achieving “Average Mastery.” This suggests that the use of the CIS facilitated a higher level of mastery among the respondents, contributing to their ability to perform the required learning competencies independently.

The “Low Mastery” level in the controlled group involves 46.07% of respondents, suggesting that a significant portion mastered only some or a few learning competencies. In the experimental group, 24.72% fall into the “Low Mastery” category, showcasing a notable improvement from the controlled group. This implies that the CIS intervention helped in elevating the mastery levels, albeit with some learners still requiring guidance or peer assistance.

The presence of one respondent (1.12%) in the controlled group categorized as “Very Low Mastery” indicates minimal mastery and performance of the learning competencies. This suggests that, under conventional teaching, there was a student who struggled to acquire the fundamental knowledge and skills necessary for the third quarter. In contrast, no respondents in the experimental group reached “Very Low Mastery,” emphasizing the potential of the CIS in addressing challenges faced by struggling learners.

These findings underscore the effectiveness of the CIS in enhancing mastery levels, with a higher percentage of respondents achieving “High Mastery” and “Average Mastery” in the experimental group compared to the controlled group. The CIS not only supports the acquisition of fundamental knowledge and skills but also promotes independent application through authentic performance tasks. As the study progresses, further investigation into specific areas of improvement and the sustainability of these gains will be crucial for a comprehensive understanding of the intervention’s impact.

Table 8 Significant Difference Between the Pre-test and Post-test Scores of the Experimental Group as Measure of their Academic Performance

Academic Performance	Pre-test		Post-test		Mean Difference	t	df	sig
(Experimental)	Mean	SD	mean	SD				
	12.39	5.08	24.87	6.41	-12.47	-31.068	88	<.001

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Table 8 highlights a significant difference between the pre-test and post-test scores in the experimental group, serving as a measure of the impact of the experimental intervention, which is the use of the Contextualized Instructional Sheet (CIS), on academic performance.

The pre-test mean score of 12.39 with a standard deviation of 5.08 indicates the baseline academic performance of the experimental group before the intervention. In contrast, the post-test mean score of 24.87 with a standard deviation of 6.41 demonstrates a substantial increase in academic performance after the experimental group received the intervention. The mean difference of -12.47 signifies a positive change, reflecting improvement from the pre-test to the post-test.

The highly significant t-value of -31.068 suggests that the observed increase in academic performance is not a result of random variation. The degrees of freedom (df) at 88 represent the number of independent observations, reinforcing the robustness of the statistical analysis. The extremely low p-value (<.001) further strengthens the conclusion that the observed differences are highly unlikely to occur by chance alone.

Interpreting these findings, it is evident that the experimental intervention, specifically the use of the CIS, had a significant and positive impact on the academic performance of the respondents. The post-test scores were not only higher but were significantly higher than the pre-test scores. This improvement is indicative of the effectiveness of the CIS in enhancing understanding and mastery of the learning competencies covered in the study.

The features of the CIS, such as Tagalog discussions and translations, the motivational aspect with “Make my Day,” and words of encouragement, likely played a pivotal role in facilitating this improvement. These features may have contributed to a more engaging and comprehensible learning experience, aiding the respondents in better understanding the presented lessons.

The significant increase in post-test scores suggests that the CIS intervention positively influenced the academic performance of the experimental group. As the study focused on specific learning competencies, the impact of the intervention on these competencies is evident. Future research could delve deeper into the specific aspects of the CIS that contributed most to this improvement, providing insights for further refinement and application in educational settings.

The statistical analysis confirms that the experimental intervention, the use of the CIS, led to a significant improvement in the academic performance of the experimental group. The features embedded in the CIS proved effective in enhancing understanding and mastery, demonstrating the potential of such instructional tools in supporting student learning and academic achievement.

Table 9 Significant Difference Between the Pre-test and Post-test Scores of the Controlled Group as Measure of their Academic Performance

Academic Performance (Controlled)	Pre-test		Post-test		Mean Difference	t	df	sig
	Mean	SD	Mean	SD				
	12.55	3.89	21.38	5.58	-8.83	-12.876	88	<.001

Table 9 illustrates a significant difference between the pre-test and post-test scores of the controlled group, serving as a measure of their academic performance. The statistical analysis provides valuable insights into the impact of conventional teaching, without the use of the Contextualized Instructional Sheet (CIS), on academic performance.

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The pre-test mean score of 12.55 with a standard deviation of 3.89 indicates the initial academic performance of the controlled group before any intervention. In contrast, the post-test mean score of 21.38 with a standard deviation of 5.58 reflects an increase in academic performance after exposure to conventional teaching methods. The mean difference of -8.83 suggests a positive change, showing an average increase in scores from the pre-test to the post-test.

The highly significant t-value of -12.876 suggests that the observed increase in academic performance is not likely to be a result of random variation. The degrees of freedom (df) at 88 represent the number of independent observations, reinforcing the robustness of the statistical analysis. The extremely low p-value (<.001) further strengthens the conclusion that the observed differences are highly unlikely to occur by chance alone.

Interpreting these findings, it is clear that conventional teaching methods alone, without the use of the CIS, resulted in a significant improvement in the academic performance of the controlled group. The post-test mean is not only higher but is significantly higher than the pre-test mean. This improvement underscores the effectiveness of conventional teaching in enhancing understanding and mastery of the learning competencies covered in the study.

The mean difference, coupled with the significant t-value and low p-value, implies that the increase in academic performance observed in the controlled group is substantial and unlikely to be attributed to random chance. This suggests that conventional teaching, as a teacher-led instructional method, can effectively enhance students' academic performance.

It is noteworthy that the controlled group, exposed to conventional teaching methods, achieved a significant positive change in academic performance. This aligns with the idea that teachers, through conventional teaching, can adapt instructional delivery based on specific learner situations and conditions to achieve learning objectives (Abah, 2020).

In conclusion, the statistical analysis indicates a significant difference between the pre-test and post-test scores in the controlled group, affirming the positive impact of conventional teaching on academic performance. While the experimental group, with the use of the CIS, demonstrated a more substantial improvement, the controlled group's progress underscores the efficacy of traditional teaching methods in fostering academic growth. These findings contribute to the ongoing discourse on effective pedagogical approaches and highlight the versatility of instructional strategies in promoting student learning and academic success.

Table 10 Significant Difference Between the Pre-test of the Experimental and Controlled Groups

Groups	Mean	SD	Mean Diff	t	df	Sig
Experimental	12.39	5.08	-0.16	-0.232	176	0.817
Controlled	12.55	3.89				

Table 10 presents an analysis of the pre-test scores between the experimental and controlled groups, aiming to discern if there is a statistically significant difference in their mean scores. The statistical analysis explores whether the two groups had similar baseline academic performance before the application of any interventions.

The pre-test mean score for the experimental group is 12.39, with a standard deviation of 5.08, while the controlled group has a mean of 12.55 and a standard deviation of 3.89. The mean difference between the experimental and controlled groups is -0.16, indicating that the controlled group has a slightly higher mean

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than the experimental group.

The t-value of -0.232 suggests that the experimental group's mean is lower than the controlled group's mean. However, the magnitude of the t-value is relatively small. The degrees of freedom (df) at 176 represent the number of independent observations. The significance level of 0.817 indicates that the observed difference between the means is not statistically significant, as this value is greater than the 0.01 level of significance.

Interpreting these results, it can be concluded that there is no statistically significant difference between the pre-test scores of the experimental and controlled groups. In other words, the observed difference in means could likely be due to random chance. This lack of statistical significance is attributed to the heterogeneous sectioning practiced in San Cristobal Integrated High School. With this type of sectioning, students of varying academic abilities and emotional needs are distributed across different classes to create a relatively even distribution.

The absence of a statistically significant difference between the experimental and controlled groups at the outset suggests that both groups started with similar baseline scores. This balanced starting point is essential for ensuring that any subsequent differences in academic performance can be attributed to the interventions, rather than pre-existing disparities between the groups.

While the experimental and controlled groups may have different instructional approaches (CIS intervention for the experimental group and conventional teaching for the controlled group), the comparable baseline scores enhance the study's internal validity. It ensures that any observed differences in post-test scores can be reasonably attributed to the interventions and not to initial disparities in academic performance.

The statistical analysis reveals that there is no statistically significant difference in the pre-test scores between the experimental and controlled groups. This suggests that the observed difference in the means is likely due to random chance, reinforcing the notion that the groups started with similar baseline scores. This enhances the study's internal validity, providing a solid foundation for assessing the impact of the interventions on subsequent academic performance.

Table 11 Significant Difference Between the Posttest of the Experimental and Controlled Groups

Groups	Mean	SD	Mean Diff	t	df	Sig
Experimental	24.87	6.41	3.48	3.867	176	<.001
Controlled	21.38	5.58				

Table 11 illustrates a significant difference between the post-test scores of the experimental and controlled groups, providing insights into the effectiveness of the interventions, namely the Contextualized Instructional Sheet (CIS) in the experimental group and conventional teaching in the controlled group, on academic performance.

The post-test mean score for the experimental group is 24.87, with a standard deviation of 6.41, while the controlled group has a mean of 21.38 and a standard deviation of 5.58. The mean difference between the experimental and controlled groups is 3.48, indicating that the experimental group has a higher mean than the controlled group.

The t-value of 3.867 is relatively large, indicating a substantial difference between the means of the two groups. The degrees of freedom (df) at 176 represent the number of independent observations. The significance level of less than 0.001 suggests that the observed difference is highly unlikely to have occurred due to random chance alone, as this value is less than the 0.01 level of significance.

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Interpreting these results, it is evident that there is a statistically significant difference between the post-test scores of the experimental and controlled groups. The experimental group, exposed to the CIS intervention, achieved a higher mean compared to the controlled group, which underwent conventional teaching methods. This significant difference supports the effectiveness of the CIS in producing better post-test results as a measure of academic performance compared to conventional teaching.

The success of the CIS in improving academic performance can be attributed to its contextualization features. The use of Tagalog translations and discussions of topics, examples familiar to respondents, and real-life applications make the learning experience authentic and relevant. Integrating values such as "Make my Day" and words of encouragement in the CIS adds personal significance to the lessons, allowing respondents to practice values while learning.

Additionally, the CIS's provision of different media, content within the respondents' context, and alignment with learning objectives contribute to effective teaching and improved understanding. The easy accessibility of the CIS, whether in printed or digital format, provides learning materials that help respondents better understand the presented lessons.

These results align with existing literature emphasizing the positive impact of contextualized instructional materials on academic performance. The study affirms that exposing learners to such materials significantly increases their academic performance.

The statistically significant difference between the post-test scores of the experimental and controlled groups supports the effectiveness of the CIS in enhancing academic performance. The contextualization features embedded in the CIS contribute to a more engaging and relevant learning experience, leading to improved understanding and mastery of the covered material. These findings contribute valuable insights into the potential of contextually-driven instructional strategies for promoting effective learning outcomes.

SUMMARY OF FINDINGS

The salient findings of the study are as follows:

The post-test scores in both the experimental and controlled groups indicate improvements in academic performance. Specifically, the experimental group, which received the Contextualized Instructional Sheet (CIS) intervention, demonstrated a significant increase in post-test scores compared to the controlled group. This suggests that the CIS intervention positively impacted students' understanding and mastery of the learning competencies covered in the study.

The strong agreement among respondents regarding the contextualization of the CIS, as evidenced by their perceptions in Table 2, underscores the effectiveness of contextualized instructional materials in facilitating learning. Incorporating familiar examples, language, and cultural elements into instructional materials enhances students' comprehension, engagement, and overall learning experiences.

The positive perception of values integration in the CIS, as indicated in Table 3, highlights the significance of incorporating values into educational materials. Values integration not only reinforces the coherence of learned values with lessons but also provides opportunities for practical application, contributing to a holistic learning experience that extends beyond academic knowledge.

The acceptability and accessibility of the CIS, as depicted in Tables 4 and 5, are crucial for ensuring that instructional materials are usable and beneficial to learners. The positive perceptions regarding the logical arrangement, accuracy, and use of diverse media elements in the CIS contribute to its acceptability, while

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efforts to improve accessibility, such as providing clearer explanations and formats, can further enhance its usability for all learners.

The significant difference between the pre-test and post-test scores of both the experimental and controlled groups, as shown in Tables 8 and 9, underscores the effectiveness of both the CIS intervention and conventional teaching methods in improving academic performance. These findings validate the importance of considering students' initial knowledge levels and implementing interventions tailored to their needs to facilitate learning and academic growth.

The study underscores the effectiveness of the CIS in enhancing learners' understanding, mastery, and academic performance. It highlights the importance of contextualization, values integration, and accessibility in instructional materials, offering valuable insights for the ongoing development of educational resources.

CONCLUSION

Based on the findings of the study, several conclusions can be drawn:

The comprehensive analysis of the Contextualized Instructional Sheet (CIS) intervention reveals its profound impact on various aspects of educational efficacy. The study demonstrates that the CIS, with its contextualization features, has been positively received by the respondents, affirming its alignment with existing literature on effective instructional design principles. The strong agreement on language, relatable examples, and cultural relevance underscores the significance of these elements in enhancing educational experiences.

Moreover, the study elucidates the CIS's effectiveness in values integration, highlighting its role in fostering coherence between lessons and values, as well as providing practical activities for value application. The positive perceptions regarding fear alleviation in math further underscore the CIS's potential to positively influence students' emotional aspects.

Furthermore, the analysis of acceptability and accessibility underscores the importance of logical arrangement, accuracy, and the use of diverse media in instructional materials. While generally perceived as acceptable and accessible, there are areas for improvement, particularly in digital access and clarity of explanations.

The comparison between pre-test and post-test scores in both controlled and experimental groups confirms the significant positive impact of the CIS on academic performance. The experimental group, exposed to the CIS intervention, exhibited substantially higher post-test scores compared to the controlled group, indicating enhanced mastery of learning competencies. These findings underscore the effectiveness of the CIS in promoting deeper understanding and mastery among students.

This study contributes valuable insights into the design and improvement of instructional materials, emphasizing the importance of contextualization, values integration, acceptability, and accessibility in enhancing educational experiences. By addressing the nuanced preferences and expectations of learners, the CIS serves as a powerful tool in fostering a more comprehensive and impactful learning environment.

RECOMMENDATIONS

Based from the findings of this study, the following recommendations were formulated:

While the findings underscore the potential of contextualized instructional materials like the CIS to

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positively impact learning outcomes, this study recommends to address challenges related to resource allocation, customization, sustainability, equity, and continuous improvement is essential for maximizing their effectiveness and ensuring equitable access to quality education for all learners for its successful implementation.

Resource Allocation: Developing and implementing contextualized instructional materials like the CIS requires resources, including time, expertise, and funding. Ensuring that these materials are effectively designed, culturally relevant, and accessible to all students may require additional investments in curriculum development, teacher training, and technology infrastructure.

Customization and Adaptation: Addressing the varied preferences and needs of learners, as highlighted in the nuanced responses across different indicators, presents a challenge in designing instructional materials that effectively cater to diverse audiences. Customizing and adapting materials to suit individual learning styles, language proficiencies, and cultural backgrounds require careful consideration and ongoing feedback mechanisms.

Sustainability and Scalability: While the CIS intervention demonstrated positive impacts on academic performance, ensuring the sustainability and scalability of such interventions across different contexts and educational settings is essential. Strategies for scaling up successful interventions while maintaining their effectiveness and relevance over time require long-term planning, collaboration, and support from educational stakeholders.

Equity and Inclusion: Ensuring equitable access to contextualized instructional materials and addressing disparities in access to technology, language proficiency, and educational resources pose challenges in promoting inclusive learning environments. Efforts to bridge these gaps and provide all students with equal opportunities to benefit from contextualized instruction require concerted efforts and collaboration among policymakers, educators, and communities.

Continuous Improvement and Evaluation: Iteratively improving instructional materials based on feedback and evaluation is essential for enhancing their effectiveness and relevance. Establishing robust mechanisms for collecting, analyzing, and acting upon feedback from students, educators, and other stakeholders can inform iterative improvements to instructional design and delivery, ultimately leading to better learning outcomes.

Moreover, school leaders may encourage their teachers to contextualized their lesson as it helps improve the academic performance of the learners. They may also encourage their teacher to use existing contextualized instructional sheet as their intervention material if it suits to the learning needs of their learners to promote academic performance. They may also provide trainings for their teachers in contextualization. Teachers may also explore more in contextualizing lesson to improve the existing contextualized instructional sheet to make their learners enjoy more in learning Mathematics.

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