International Journal of Multidisciplinary Research and Growth Evaluation.

"Designing Impact: Evaluating Contextualized and Localized Digital Learning Aids from Print to Paperweight"

Zeniepe D Balingit [1*], **Nelia S Raganas PhD** [2]
[1] Guinabsan National High School, Philippines
[2] Agusan Colleges Inc., Philippines

* Corresponding Author: **Zeniepe D Balingit**

Article Info

Abstract

This study aimed to evaluate the format of Contextualized and Localized Digital Learning Aids (CLDLAs) developed for Grade 7 Science instruction, focusing on five key components: prints, illustrations, design and layout, paper and binding, and size and weight. The objective was to determine the quality, usability, and contextual relevance of the CLDLAs, particularly in rural public-school settings, and to assess whether they met educational standards and supported learner engagement. A descriptive-developmental research design was employed, combining systematic evaluation with instructional material development. The descriptive phase examined the current status of science instruction and identified learning gaps through a formative diagnostic test administered to 114 Grade 7 students at Guinabsan National High School in Buenavista, Agusan del Norte. The developmental phase involved designing CLDLAs using Canva, integrating localized cultural elements and interactive features. The design was anchored on Constructivist Learning Theory, Cognitive Load Theory, and the Technology Acceptance Model to ensure pedagogical soundness and cognitive accessibility. Expert validators including science teachers, ICT specialists, and education professionals assessed the CLDLAs using the DepEd Level 2 Evaluation Rating Sheet and a four-point Likert scale. Descriptive statistics were used to analyze the mean and standard deviation of ratings across four dimensions: content accuracy, format and design, presentation and organization, and curriculum alignment. Findings revealed that CLDLA 1 and CLDLA 2 received overall weighted means of 3.93 and 3.86, respectively, interpreted as "Very Satisfactory." High ratings were observed in prints, illustrations, design and layout, and size and weight, while paper and binding received a moderate score of 3.45. These results indicate strong design integrity and contextual relevance. The CLDLAs were validated as effective, user-friendly, and culturally responsive instructional tools, highly recommended for enhancing science education in rural classrooms.

Keywords: Contextualization, Digital Learning Aids, Instructional Design

1. Introduction

In today's rapidly evolving educational landscape, instructional materials play a pivotal role in shaping effective teaching and meaningful learning. Learning aids are no longer mere supplements; they are essential tools that enhance comprehension, sustain engagement, and improve academic performance (Ma'rifatullah *et al*., 2023) [5], with the rise of 21st-century education, there has been a global shift toward integrating technology into classrooms, resulting in the development of adaptive, interactive, and learner-centered resources. Among these, digital learning aids stand out for their ability to accommodate diverse learning styles, foster autonomy, and make abstract concepts more accessible and engaging (Reyes *et al*., 2020) [7].

Recognizing the transformative potential of technology in instructional design, the Department of Education (DepEd) has issued key policies to promote the development and use of digital, localized, and context-based learning tools. DepEd Order No. 018, s. 2020 [2] emphasizes the importance of accessible and culturally relevant resources to support continuous learning, while DepEd Memorandum No. 039, s. 2023 [3] encourages the integration of digital arts and multimedia platforms in crafting instructional materials that reflect the unique contexts of Filipino learners. These directives imply the need for educational content that is not only pedagogically sound but also responsive to the lived realities of students.

In the rural setting of Guinabsan National High School, traditional textbook-driven and teacher-centered approaches remain dominant, posing significant challenges in science education. Abstract scientific concepts often require deeper engagement and contextual understanding yet limited access to modern tools and the absence of culturally relevant materials have contributed to low motivation and declining performance among students. The lack of instructional resources that connect science lessons to students' everyday experiences has further widened the gap between theoretical knowledge and practical application.

To address these challenges, this study was undertaken to design and evaluate Contextualized and Localized Digital Learning Aids (CLDLAs) tailored specifically for Grade 7 Science learners at Guinabsan National High School. These digital aids were developed to align scientific content with students' cultural, environmental, and social contexts, making learning more relatable, tangible, and engaging. By incorporating real-life examples and familiar scenarios, the CLDLAs aimed to bridge conceptual gaps and enhance instructional relevance.

2. Theoretical Framework

This study is anchored on two foundational learning theories: Constructivist Learning Theory (Piaget, 1952; Vygotsky, 1978) [6, 10] and Cognitive Load Theory (Sweller, 1988) [8]. These frameworks provided both the philosophical and practical basis for designing, developing, and evaluating the Contextualized and Localized Digital Learning Aids (CLDLAs), ensuring that the instructional materials were pedagogically sound, cognitively efficient, and contextually relevant to Grade 7 learners in rural settings.

Constructivist Learning Theory posits that learners construct knowledge through experience, reflection, and social interaction. Piaget emphasized individual cognitive development through exploration, while Vygotsky highlighted the role of cultural and social contexts in shaping learning. This theory supported the study by guiding the creation of learning aids that were not only interactive and student-centered but also embedded in the learners' real-world experiences. The CLDLAs incorporated familiar cultural elements such as the use of "timba" (pail) and bamboo sticks to bridge abstract scientific concepts with students' everyday lives. This approach validated the constructivist principle that meaningful learning occurs when instruction builds upon prior knowledge and is situated within authentic contexts.

Cognitive Load Theory, on the other hand, asserts that the human brain has limited processing capacity, and instructional materials should be designed to minimize extraneous cognitive load while enhancing germane load.

This theory informed the structural and visual design of the CLDLAs, ensuring that content was well-organized, chunked into manageable segments, and supported by visual aids and scaffolded instructions. By reducing unnecessary complexity and aligning content with students' cognitive readiness, especially in a rural school setting, the CLDLAs promoted deeper understanding and long-term retention. The integration of interactive features and localized examples helped learners focus on core scientific ideas without being overwhelmed by unfamiliar or irrelevant information.

These theories shaped the study's conceptual and methodological direction from identifying the least learned competencies to designing culturally responsive materials and validating them through expert evaluation. More importantly, the study reciprocally supported these theories by demonstrating their practical applicability in a real-world educational context. The successful implementation and positive evaluation of the CLDLAs affirmed that constructivist and cognitive principles can be effectively operationalized in digital learning environments, even in resource-constrained settings. The study thus contributes to the growing body of evidence that theory-informed instructional design enhances learner engagement, accessibility, and academic performance.In essence, Designing Impact: Evaluating Contextualized Digital Learning Aids from Print to Paperweight exemplifies how theoretical grounding in constructivism and cognitive load management can lead to the development of impactful educational tools. It also reinforces the relevance of these theories in guiding innovations that respond to local needs, promote inclusive learning, and elevate the quality of science education in rural public schools.

3. Problem Formulation

This study aimed to determine how experts evaluated the Contextualized and Localized Digital Learning Aid (CLDLA) in terms of its format, specifically focusing on five key components: prints, illustrations, design and layout, paper and binding, and size and weight. As part of the broader goal of designing impactful and culturally responsive instructional materials, the research assessed the quality and effectiveness of the CLDLA's physical and visual presentation. The evaluation provided insights into whether the developed learning aids met educational standards and were suitable for classroom use, particularly in rural public schools. Through expert ratings and feedback, the study validated the design and development process and ensured that the CLDLA supported learner engagement, usability, and contextual relevance.

4. Significance of the Study

The significance of this study lies in its potential to enhance science education, particularly in public schools located in rural areas where access to modern instructional resources is limited. By developing and validating Contextualized and Localized Digital Learning Aids (CLDLAs), the study addresses the disconnect between scientific concepts and students' everyday experiences. For Grade 7 learners, these materials offer culturally relevant, geographically grounded, and socially meaningful content that fosters deeper understanding and active engagement, thereby improving academic performance and motivation. Science teachers benefit from the availability of pedagogically sound, learner-centered tools that integrate Constructivist Learning Theory,

Cognitive Load Theory, and the Technology Acceptance Model, enabling them to implement more effective and interactive teaching strategies aligned with national curriculum standards. Moreover, the study provides a robust theoretical and methodological foundation for future researchers interested in educational technology, instructional design, and contextualized learning. It opens avenues for further exploration into the long-term impact of CLDLAs, their adaptability in inclusive settings, and their application across other subject areas. Ultimately, this research contributes to the advancement of innovative, equitable, and responsive educational practices that support meaningful learning in diverse and underserved contexts.

5. Scope and Limitations
This study was confined to the development and validation of contextualized and localized digital learning aids (CLDLAs) specifically for Grade 7 students at Guinabsan National High School. It focused on designing, producing, and evaluating the digital aids in enhancing the teaching and learning process for selected science topics. The scope of the study was limited to the design, development, and expert review of the CLDLAs based on the identified least learned competencies of the students during the first quarter of the academic year 2025–2026, as determined through students' performance data, teacher assessments, and curriculum guidelines.

6. Methodology
This study employed a descriptive-developmental research design, integrating two complementary approaches. The descriptive phase examined the current status and effectiveness of Contextualized and Localized Digital Learning Aids (CLDLAs) in Grade 7 Science, while the developmental phase focused on designing, validating, and refining these instructional materials based on identified learning gaps and expert feedback.

The research was conducted at Guinabsan National High School, a rural public secondary school in Buenavista,

Agusan del Norte. The entire population of 114 Grade 7 Science students across three sections participated in the study, selected through complete enumeration to ensure full coverage. Additionally, a panel of validators—comprising science teachers, ICT specialists, and education experts—was involved in evaluating the CLDLAs for content quality, contextualization, technical soundness, and pedagogical relevance.

To identify the least learned competencies, a formative diagnostic test was administered, revealing significant gaps in students' ability to measure liquid volume and physical quantities accurately. These findings guided the development of CLDLAs using Canva, incorporating localized elements (e.g., "timba" and bamboo sticks), interactive features, and offline accessibility. The design was grounded in Constructivist Learning Theory, Cognitive Load Theory, and the Technology Acceptance Model.

The CLDLAs were evaluated using the DepEd Level 2 Evaluation Rating Sheet, applying a four-point Likert scale ranging from 1 (Poor) to 4 (Very Satisfactory). Validators assessed the materials across four dimensions: content accuracy, format and design, presentation and organization, and curriculum alignment. Based on their feedback, revisions were made following the ADDIE Instructional Design Model to improve clarity, safety, and durability.

For data analysis, descriptive statistics were used to compute the mean and standard deviation of validator ratings. The mean scores indicated the level of approval, while the standard deviation reflected the consistency of expert evaluations. This rigorous, multi-phased methodology ensured the development of valid, reliable, and contextually appropriate digital learning aids tailored to the needs of Grade 7 Science learners

7. Results and Discussion
Table 1 presents the results the weighted mean distribution of the evaluation of the CLDLA

Table 1: The weighted mean distribution of the evaluation of the CLDLA 2

No.	Criteria / Sub-Item	CDLA 2 Weighted Mean	CDLA 2 Verbal Description	CDLA 2 Interpretation
1	Prints			
1.1	Size of letters is appropriate	4.00	VS	HR
1.2	Spaces between letters and words	4.00	VS	HR
1.3	Font is easy to read	4.00	VS	HR
1.4	Printing quality	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
2	Illustrations			
2.1	Simple and recognizable	4.00	VS	HR
2.2	Clarify and supplement text	4.00	VS	HR
2.3	Properly labeled/captioned	4.00	VS	HR
2.4	Realistic/appropriate colors	4.00	VS	HR
2.5	Attractive and appealing	4.00	VS	HR
2.6	Culturally relevant	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
3	Design and Layout			
3.1	Attractive and pleasing to look at	4.00	VS	HR
3.2	Simple (does not distract attention)	4.00	VS	HR
3.3	Adequate illustration in relation to the text	4.00	VS	HR
3.4	Harmonious blending of elements	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
4	Paper and Binding			
4.1	The paper used contributes to easy reading	3.60	VS	HR
4.2	Durable binding to withstand frequent use	3.30	S	MR
	Average Weighted Mean	3:45	S	MR

5	Size and Weight of SLR			
5.1	Easy to handle	3.60	VS	HR
5.2	Relatively light	4.00	VS	HR
	Average Weighted Mean (Overall)	3.86	VS	HR

Legend: Weighted Mean (WM); Verbal Description (VD); Interpretation (I); 1.00-1.49-(P)/Not Recommended (NR) 1.50-2.49-Fair (F)/Recommended(R); 2.50-3.49 Satisfactory(S)/ Moderately Recommended (MR); 3.50-4.00- very satisfactory (VS)/Highly recommended (HR)

Table 2: The weighted mean distribution of the evaluation of the CLDLA 2

No.	Criteria / Sub-Item	CDLA 2 Weighted Mean	CDLA 2 Verbal Description	CDLA 2 Interpretation
1	Prints			
1.1	The size of the letters is appropriate	4.00	VS	HR
1.2	Spaces between letters and words	4.00	VS	HR
1.3	The font is easy to read	4.00	VS	HR
1.4	Printing quality	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
2	Illustrations			
2.1	Simple and recognizable	4.00	VS	HR
2.2	Clarify and supplement text	4.00	VS	HR
2.3	Properly labeled/captioned	4.00	VS	HR
2.4	Realistic/appropriate colors	4.00	VS	HR
2.5	Attractive and appealing	4.00	VS	HR
2.6	Culturally relevant	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
3	Design and Layout			
3.1	Attractive and pleasing to look at	4.00	VS	HR
3.2	Simple (does not distract attention)	4.00	VS	HR
3.3	Adequate illustration in relation to text	4.00	VS	HR
3.4	Harmonious blending of elements	4.00	VS	HR
	Average Weighted Mean	4.00	VS	HR
4	Paper and Binding			
4.1	Paper used contributes to easy reading	3.60	VS	HR
4.2	Durable binding to withstand frequent use	3.30	S	MR
	Average Weighted Mean	3:45	S	MR
5	Size and Weight of SLR			
5.1	Easy to handle	3.60	VS	HR
5.2	Relatively light	4.00	VS	HR
	Average Weighted Mean (Overall)	3.86	VS	HR

Legend: Weighted Mean (WM); Verbal Description (VD); Interpretation (I); 1.00-1.49-(P)/Not Recommended (NR) 1.50-2.49-Fair (F)/Recommended(R); 2.50-3.49 Satisfactory(S)/ Moderately Recommended (MR); 3.50-4.00- very satisfactory (VS)/Highly recommended (HR)

Discussion

Tables 1 and 2 present the evaluation results of both CLDLA 1, The Volume Measurement, and CLDLA 2, Standard and Non-Standard Units of Measurement, the Contextualized and Localized Learning Aid (CLDLA). Findings show that the learning aid developed resulted in an overall weighted means of 3.93 and 3.86, respectively interpreted as very satisfactory. This implies that, in terms of format in the five components, the CLDLA is highly recommended (HR) for classroom use. These components are indicated as follows: In terms of prints for Item #2, the indicators on print quality (size of letters, spacing, readability of font, and printing quality) received a weighted mean of 3.93 (VS/HR), suggesting that while the materials are generally clear and legible, there is slight room for improvement in ensuring consistency in printing quality. For Item #8, all aspects of print earned a perfect rating of 4.0 (VS/HR), showing that the format was fully satisfactory to the evaluators when validating the learning aid that focuses competencies on LLC item 8. In terms of illustrations, both items received consistently high ratings (4.0, VS/HR) across all indicators, such as simplicity, clarity, cultural relevance, and attractiveness. This implies that the illustrations not only support textual content but also enhance learner engagement and contextualization. Similarly, both items scored the highest possible mean (4.0, VS/HR) when it comes to design and layout. This implies that the materials are well-balanced, visually appealing, and free from distracting elements. This highlights the strong design quality of the CLDLA.

On the other hand, for Item #2, data reveal that the paper and binding quality receives a moderate rating (3.45, S/MR). This implies that the quality is acceptable but not exceptional, indicating a moderate level of approval or recommendation. However, for Item #8, this indicator still received the low rating (3.45, S/MR), indicating concerns about paper quality or binding strength that could affect the longevity of the material; however, this instrument is designed to be used in digital form. In terms of size and weight, both items reveal the highest rating of 4.0 (VS/HR). This implies that the CLDLA is user-friendly, easy to handle, and appropriate for the Grade 7 students.

In summary, the findings demonstrate that the format of the CLDLA exhibited strong quality and consistency across most evaluated indicators. The high format ratings corroborate studies on digital material design. The Department of Education's DepEd Memorandum No. 039, s. 2023 [3], stresses user-friendly formats with clear prints and durable elements for rural accessibility, aligning with the VS/HR interpretations. Kusumo *et al*. (2023) [4] noted that lightweight, appealing designs enhance usability in low-

resource areas.

8. Conclusion
The study successfully developed and evaluated Contextualized and Localized Digital Learning Aids (CLDLAs) for Grade 7 Science, specifically targeting the topics of Volume Measurement and Standard and Non-Standard Units of Measurement. The evaluation results revealed that both CLDLA 1 and CLDLA 2 achieved overall weighted means of 3.93 and 3.86, respectively, interpreted as "Very Satisfactory." These findings indicate that the learning aids are highly recommended for classroom use, particularly in rural educational settings where access to engaging and relevant instructional materials is limited.

Across the five key format components, prints, illustrations, design and layout, paper and binding, and size and weight, the CLDLAs demonstrated strong quality and consistency. High ratings in print clarity, culturally relevant illustrations, and well-balanced design affirmed the materials' effectiveness in enhancing learner engagement and comprehension. Although the paper and binding component received a moderate rating, this limitation was mitigated by the digital nature of the materials, which prioritized accessibility and durability in low-resource contexts.

The study concludes that the CLDLAs are pedagogically sound, visually effective, and contextually appropriate. Their development addressed the identified learning gaps in science and aligned with national education policies promoting localized, technology-integrated instruction. The positive evaluation results validate the impact of theory-informed, culturally grounded instructional design in improving the quality and relevance of science education for Grade 7 learners.

9. Thank-You Note
The researchers extend their sincere appreciation to all fellow scholars and contributors who participated in the study by providing thoughtful responses to the test questionnaire. Their insights and expertise played a vital role in enriching the research process and strengthening the validity of the findings. The generosity of these participants in sharing their knowledge reflects a shared commitment to advancing educational inquiry and collaborative scholarship. Their contributions are deeply valued and gratefully acknowledged.

10. References
1. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989;13(3):319-40.
2. Department of Education (DepEd). DepEd Order No. 018, s. 2020: Policy guidelines for learning resources. Manila: DepEd; 2020.
3. Department of Education (DepEd). DepEd Memorandum No. 039, s. 2023: Digital arts and multimedia tools. Manila: DepEd; 2023.
4. Kusumo A, Raharjo S, Putri DN, Santoso B. The impact of technology-based learning on student engagement and academic performance in higher education. [publisher unknown]; 2023.
5. Ma'rifatullah M, Umamah N, Marjono. The development of interactive and innovative e-modules based on life skills to improve student learning outcomes. Int J Interact Multimed Educ. 2021;2(1):31-9.
6. Piaget J. The origins of intelligence in children. New York: International Universities Press; 1952.
7. Reyes LC, Santos MP, Cruz ED. E-modules for Filipino science learners. Philipp Educ Technol J. 2020;7(2):55-70.
8. Sweller J. Cognitive load during problem solving. Cogn Sci. 1988;12(2):257-85.
9. UNESCO. Digital learning for rural schools: Global trends and challenges. Paris: UNESCO; 2021.
10. Vygotsky LS. Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press; 1978.

Available from: https://ijirme.com/v2i1/Doc/7.pdf

How to Cite This Article

Creative Commons (CC) License