







ORIGINAL

The Impact of Online Learning on Primary Graders' Reading Comprehension: Challenges and Instructional Strategies

El impacto del aprendizaje en línea en la comprensión lectora de alumnos de primaria: desafíos y estrategias de enseñanza

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ABSTRACT

Introduction: this study aims to describe the reading comprehension levels of primary graders and characterize the challenges they encountered during online learning amidst the COVID-19 pandemic.

Method: a descriptive mixed-methods research design was employed, involving 194 primary graders (Grades 1 to 3) from a private school in Iligan City, Philippines. Quantitative data were gathered through comprehension assessments, while qualitative data were collected to identify perceived reading challenges. Data were analyzed using descriptive statistics and thematic analysis.

Results: results revealed that most students performed well in literal comprehension, but fewer attained high levels in interpretative, evaluative, and creative comprehension. The most prominent challenge reported was self-regulation, followed by technological literacy and learning environment constraints. Student isolation was perceived as the least significant challenge. These findings suggest that while learners could recall factual information, they struggled with higher-order thinking skills and independent learning in online settings.

Conclusions: the study highlights the need to enhance interpretative, evaluative, and creative comprehension skills through targeted interventions. A curriculum-based instructional material was developed to address these gaps, offering structured, engaging, and developmentally appropriate reading activities. This material may support teachers and education stakeholders in fostering effective reading instruction in digital contexts and preparing for future educational disruptions.

Keywords: Online Learning; Levels of Reading Comprehension; Beginning Reading; Instructional Material Design.

RESUMEN

Introducción: este estudio busca describir los niveles de comprensión lectora de estudiantes de primaria y caracterizar los desafíos que encontraron durante el aprendizaje en línea durante la pandemia de COVID-19.

Método: se empleó un diseño de investigación descriptivo de métodos mixtos, con 194 estudiantes de primaria (de 1.º a 3.º grado) de una escuela privada en la ciudad de Iligan, Filipinas. Se recopilaban datos cuantitativos mediante evaluaciones de comprensión, mientras que se recopilaban datos cualitativos para identificar los

desafíos de lectura percibidos. Los datos se analizaron mediante estadística descriptiva y análisis temático.

Resultados: los resultados revelaron que la mayoría de los estudiantes tuvieron un buen desempeño en comprensión literal, pero menos alcanzaron niveles altos en comprensión interpretativa, evaluativa y creativa. El desafío más destacado reportado fue la autorregulación, seguido de la alfabetización tecnológica y las limitaciones del entorno de aprendizaje. El aislamiento estudiantil se percibió como el desafío menos significativo. Estos hallazgos sugieren que, si bien los estudiantes podían recordar información factual, tuvieron dificultades con las habilidades de pensamiento de orden superior y el aprendizaje independiente en entornos en línea.

Conclusiones: el estudio destaca la necesidad de mejorar las habilidades de comprensión interpretativa, evaluativa y creativa mediante intervenciones específicas. Se desarrolló un material didáctico basado en el currículo para abordar estas deficiencias, ofreciendo actividades de lectura estructuradas, atractivas y apropiadas para el desarrollo. Este material puede ayudar a docentes y actores educativos a fomentar una enseñanza eficaz de la lectura en contextos digitales y a prepararse para futuras disrupciones educativas.

Palabras clave: Aprendizaje en Línea; Niveles de Comprensión Lectora; Lectura Inicial; Diseño de Materiales Didácticos.

INTRODUCTION

Reading comprehension is the ability to understand, interpret, and evaluate written texts, enabling learners to extract meaning, form judgments, and apply knowledge across contexts. It is a foundational skill essential for academic achievement, particularly in the early grades. Online learning, defined as the delivery of educational content via the internet, became a primary mode of instruction during the COVID-19 pandemic. While effective for older students with advanced literacy and self-regulation skills, it posed unique challenges for younger learners, especially in developing nations.

The COVID-19 pandemic profoundly disrupted education systems worldwide, forcing an abrupt transition from traditional face-to-face learning to online and distance education. As of mid-2020, more than 1,6 billion learners in over 190 countries were affected by school closures.^(1,2) This shift exposed deep-seated vulnerabilities in educational infrastructures, particularly in countries with uneven access to digital technology and low levels of digital literacy. The sudden adoption of remote learning highlighted existing disparities, disproportionately affecting students from historically disadvantaged backgrounds. In South Africa, for example, students lacking access to essential technology and stable internet connectivity struggled to engage in virtual classes, leading to increased dropout rates and reduced academic performance.⁽¹⁾

In the Philippines, the education sector experienced similar disruptions. Teachers and students faced difficulties adjusting to remote learning due to inadequate technological resources and limited training for online instruction.^(3,4) Many educators reported heightened anxiety and uncertainty, struggling with unreliable internet access and adapting their pedagogical approaches to digital environments.^(5,6) Socioeconomic barriers further complicated learning: approximately 62,64 % of students expressed concerns about their living conditions, revealing the pressures of financial instability, food insecurity, and health concerns during the pandemic.⁽⁵⁾

To ensure learning continuity, the Philippine government implemented alternative learning modalities such as printed modules, TV and radio broadcasts, and online classes.⁽⁷⁾ Despite these initiatives, challenges persisted—particularly in reading instruction, a subject requiring high levels of interaction. Extended lockdowns contributed to educational instability, impacting students' cognitive development and psychological well-being.⁽⁸⁾ Although DepEd promoted innovative teaching strategies leveraging technology, their effectiveness varied depending on the digital readiness of both students and teachers.⁽⁹⁾

One major concern in online learning for primary graders is the development of reading comprehension. Teachers reported significant difficulty in teaching reading through digital means, citing insufficient training and unfamiliarity with online platforms as major barriers.^(10,11) They struggled to use online teaching tools and maintain students' engagement in virtual classrooms, often feeling unprepared for the technical demands of delivering effective reading instruction.^(12,13) Moreover, a lack of suitable instructional materials made it difficult to sustain learners' interest in reading. Multimedia tools like videos and gamified activities were introduced, but their success depended on students' access to technology.^(14,15) Students from underprivileged backgrounds faced disproportionate disadvantages due to poor internet connectivity and lack of digital devices.⁽¹⁶⁾

Student motivation and engagement were further hindered by the absence of face-to-face interaction. Teachers noted decreased attention spans and increased distractions in virtual environments, with students often reluctant to participate in reading activities.^(12,13) Parental involvement, which became crucial in supporting children's literacy, was limited—especially in rural areas where digital literacy among parents was low.^(16,17) Without structured training and resources, many parents were unable to assist their children effectively, compounding the challenges of remote reading instruction.

Despite extensive research on the broader impacts of online learning, few studies have focused specifically on its effects on primary students' reading comprehension and the design of instructional materials to address identified challenges. Therefore, this study aims to describe the reading comprehension levels of primary graders in online learning and to characterize the challenges they face. The findings will serve as a basis to develop and propose a structured instructional material design that enhances reading comprehension and supports effective instruction in digital learning environments. Through this, the study seeks to contribute to strengthening literacy education during and beyond global crises.

METHOD

This study employed a descriptive mixed-methods research design, integrating both qualitative and quantitative approaches to provide a comprehensive examination of primary graders' reading challenges and reading comprehension levels in an online learning environment. The descriptive aspect focuses on detailing the phenomena, while the mixed-methods approach allows triangulation of qualitative perceptions and quantitative measures.

Timeline and Location

The study was conducted from September to November 2024 at a private basic education school in Iligan City, Lanao del Norte. This school continued implementing online learning modalities during the COVID-19 pandemic.

Universe, Population, and Sampling

The target population consisted of all primary graders (Grades 1 to 3) enrolled in the private school's online learning program during the study period. The total universe included approximately 200 students. Using purposive sampling, 194 students who met the criteria of active enrollment in online classes and consistent attendance were selected. The sample breakdown was: 67 Grade 1 students (34,54 %), 62 Grade 2 students (31,96 %), and 65 Grade 3 students (33,50 %), ages ranging from 5 to 8 years.

Methodological Definitions

- Reading Challenges: difficulties perceived by students in decoding, comprehension, and engagement during online reading activities.
- Reading Comprehension Level: quantitative measurement of students' ability to understand and interpret texts administered through standardized reading assessments.
- Mixed-Methods Design: a research strategy combining qualitative data (interviews, observations) and quantitative data (test scores, surveys) to enrich the analysis.

Designing Process

The study began with identifying the research questions related to literacy development in online learning. Data collection instruments were developed, including a structured survey for reading challenges and a reading comprehension test validated by literacy experts. Qualitative data were gathered through semi-structured interviews with selected students and teachers to explore contextual factors affecting reading. Quantitative data collection involved administering the reading comprehension test face-to-face while adhering to health protocols. The combined data were then analyzed to compare perceived difficulties and actual performance.

Survey Characterization and Application

A researcher-designed survey measured students perceived reading difficulties using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The survey was piloted to ensure clarity and reliability before full administration. Data were collected through individual sessions to ensure understanding and accurate responses, with assistance provided when necessary.

Data Saving and Processing

Quantitative data from tests and surveys were encoded and inputted into the Statistical Package for the Social Sciences (SPSS) version 20 for analysis. Frequency distributions, means, and standard deviations were calculated to summarize results and variability. Qualitative data from interviews were audio-recorded (with consent), transcribed verbatim, and thematically analyzed to identify recurrent patterns related to reading challenges.

Ethical Considerations

Prior to data collection, informed consent was obtained from parents or guardians, and assent was secured from the participating students. Confidentiality and anonymity were maintained by assigning codes instead of

using names. All data were securely stored and only accessed by the research team. The study strictly followed COVID-19 safety protocols during face-to-face interactions in compliance with the Inter-Agency Task Force (IATF) health guidelines.

RESULTS

Table 1. Perceived Reading Challenges of the Primary Graders

| Perceived Challenges by Theme | Gr 1 M | Gr 2 μ | Gr 3 μ | Over-all μ | Description | Interpretation |
|---|-----------|-----------|-----------|---------------|-------------|----------------|
| Self-regulation challenges (SRC) | 2,01 | 2,44 | 2,29 | 3 | Sometimes | Neutral |
| Technological literacy and competency challenges (TLCC) | 2,31 | 1,81 | 2,07 | 2,06 | Seldom | Unacceptable |
| Student isolation challenges (SIC) | 1,87 | 1,77 | 2,00 | 1,88 | Seldom | Unacceptable |
| Technological sufficiency challenges (TSC) | 1,95 | 1,78 | 2,06 | 1,93 | Seldom | Unacceptable |
| Technological complexity challenges (TCC) | 1,90 | 1,87 | 2,26 | 2,01 | Seldom | Unacceptable |
| Learning resource challenges (LRC) | 1,73 | 1,88 | 2,15 | 1,92 | Seldom | Unacceptable |
| Learning environment challenges (LEC) | 2,10 | 2,15 | 1,92 | 2,06 | Seldom | Unacceptable |
| Mean | | | | 2,12 | Seldom | Unacceptable |

Source: Barrot et al.⁽⁶⁾

Table 1 presents the perceived reading challenges of primary graders in an online learning environment, categorized into key themes. The overall mean score of 2,12, interpreted as *Seldom*, suggests that while these challenges exist, they are not frequently encountered. Among the seven identified challenge categories, Self-Regulation Challenges (SRC) had the highest mean score of 3,0 (*Neutral*), indicating that students sometimes struggle with maintaining discipline, motivation, and independence in an online learning setup. Although not overwhelmingly problematic, these difficulties highlight the need for strategies to support students' self-directed learning. In contrast, all other challenge categories—including Technological Literacy and Competency Challenges (TLCC), Student Isolation Challenges (SIC), Technological Sufficiency Challenges (TSC), Technological Complexity Challenges (TCC), Learning Resource Challenges (LRC), and Learning Environment Challenges (LEC)—were rated as *Seldom* and classified as *Unacceptable*. While these issues occur less frequently, they should not be overlooked. A closer examination reveals that technological literacy, learning resources, and environmental factors are minor concerns for most students, suggesting adequate access to technology, digital learning tools, and reading materials. However, technological sufficiency and complexity challenges indicate that some students occasionally struggle with navigating digital tools or managing internet-related issues. Student isolation challenges (SIC), with a mean of 1,88, suggest that while some students may feel disconnected in online learning, it is not a major obstacle to comprehension. Similarly, learning resource (LRC) and learning environment challenges (LEC), with means of 1,92 and 2,06, respectively, indicate that while some students face distractions or a lack of study materials, these concerns are not widespread. Overall, the findings suggest that self-regulation is the most significant challenge, while technological, social, and resource-related difficulties are present but less prominent. The classification of all challenges as *Unacceptable* underscores the importance of proactive intervention. Educators and schools must implement strategies such as promoting self-regulated learning, providing continuous technological support, and fostering student engagement. While students generally adapt to online learning, targeted interventions remain essential for enhancing their reading comprehension and overall learning experience.

Primary graders' levels of reading comprehension

Table 2 presents a summary of the reading comprehension abilities of primary graders across four levels: literal, interpretative, evaluative, and creative. The majority of students demonstrated strong performance in literal comprehension, with 72,63 % (141 students) achieving a high level, indicating their ability to recall facts and details directly from texts. However, as comprehension tasks became more complex, performance declined. In interpretative comprehension, which involves understanding implied meanings, only 58,87 % (114 students)

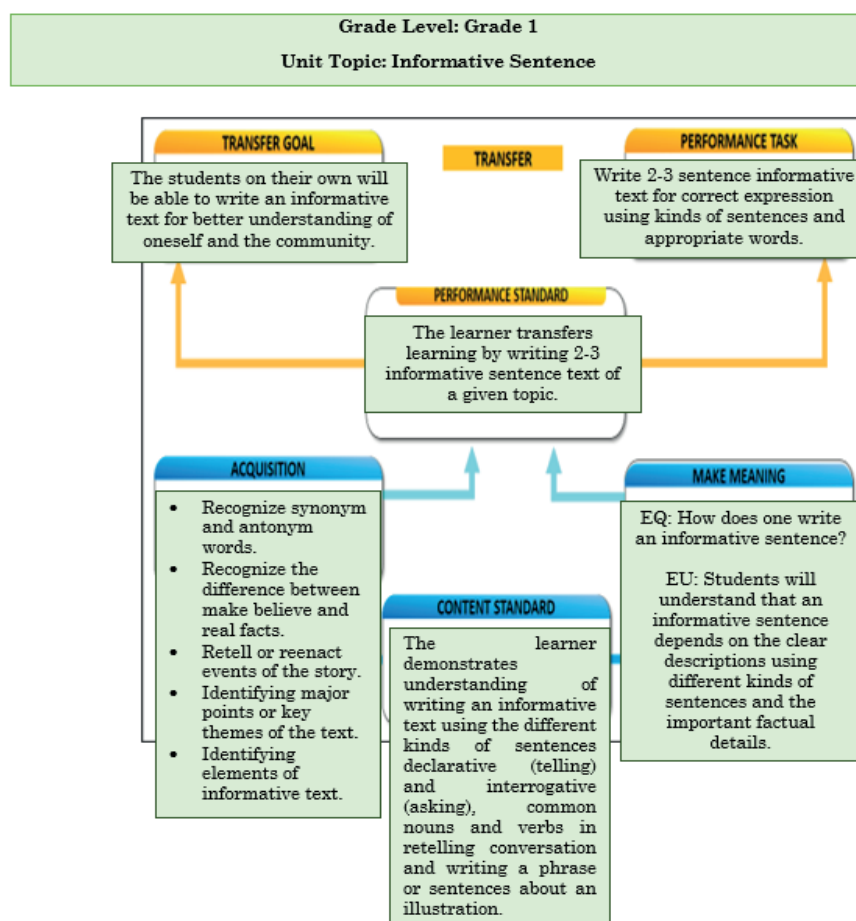
reached a high level, while 19,53 % (38 students) remained at a low level, suggesting that a notable portion of students struggle with drawing inferences from reading materials. Similarly, in evaluative comprehension, which requires critical assessment and judgment of information, 56,12 % (109 students) performed at a high level, whereas 17,82 % (35 students) scored low, indicating challenges in forming reasoned opinions based on texts. The most demanding level was creative comprehension, where only 45,87 % (89 students) achieved a high level, while 27,43 % (53 students) fell into the low category. This suggests that many students struggle with generating original ideas and applying learned concepts creatively in their reading. The overall trend highlights a progressive decline in performance as cognitive demands increase, with fewer students excelling at higher-order comprehension skills and more falling into average or low categories.

Table 2. Summary Reading Comprehension Ability of the Primary Graders

| Achievement Level | Literal | | Interpretative | | Evaluative | | Creative | |
|-------------------|----------|-------|----------------|-------|------------|-------|----------|-------|
| | <i>f</i> | % | <i>f</i> | % | <i>F</i> | % | <i>f</i> | % |
| High | 141 | 72,63 | 114 | 58,87 | 109 | 56,12 | 89 | 45,87 |
| Average | 47 | 24,19 | 42 | 21,59 | 50 | 26,06 | 52 | 26,7 |
| Low | 6 | 3,18 | 38 | 19,53 | 35 | 17,82 | 53 | 27,43 |
| TOTAL | 194 | 100 | 194 | 99,99 | 194 | 100 | 194 | 100 |

These findings indicate that while most students are proficient in recalling information, their ability to interpret, evaluate, and generate new ideas based on texts needs further development. To address this, instructional strategies should emphasize higher-order thinking skills such as inference-making, critical analysis, and creative expression. Teachers may enhance comprehension through discussion-based learning, reflective questioning, and project-based activities, fostering deeper engagement with texts and improving students' overall reading abilities.

Enhancing Reading Comprehension Through Structured Instructional Material



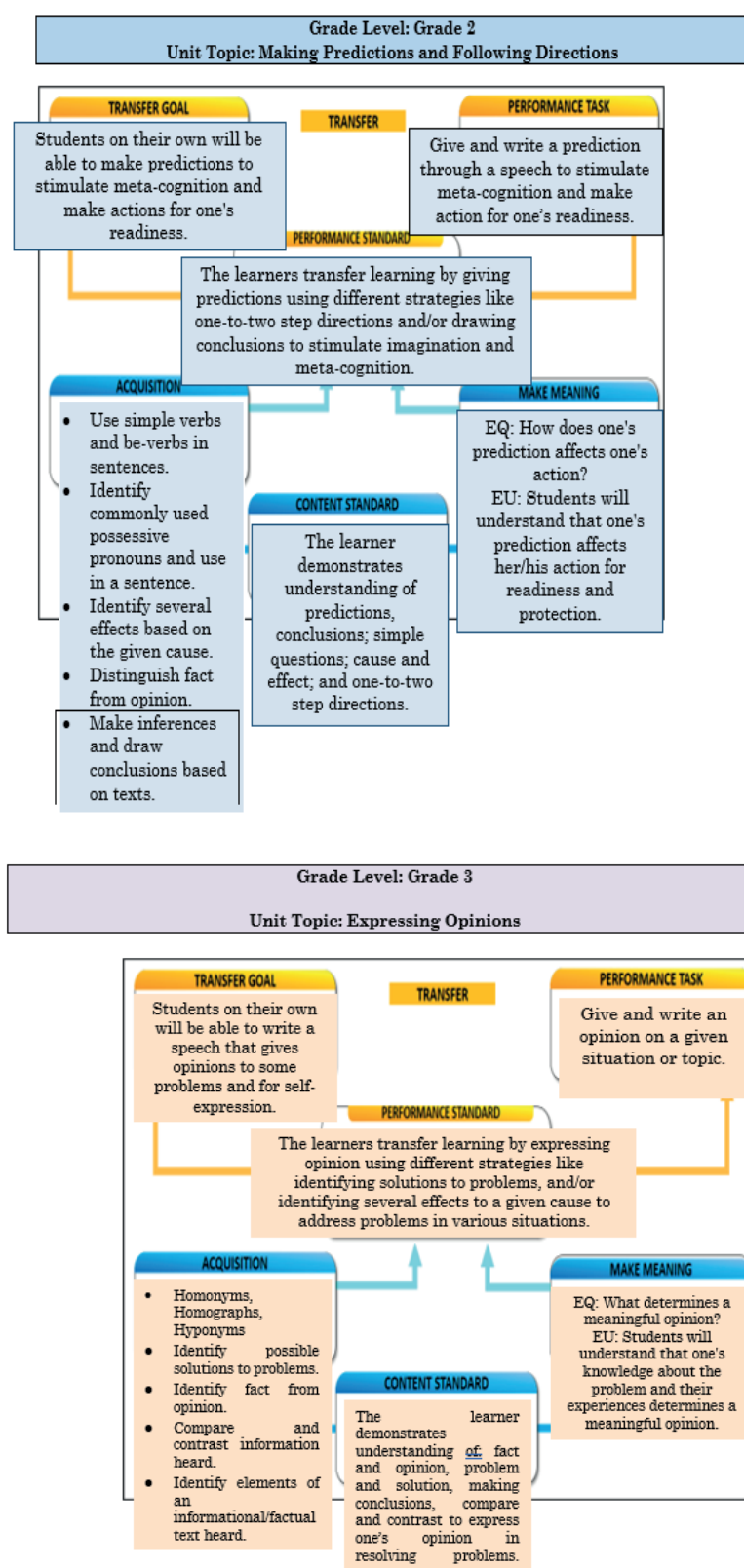


Figure 1. Reading Instructional Material Design

Based on the data collected, the areas of comprehension that require greater focus in online learning to enhance reading comprehension are interpretative, evaluative, and creative comprehension. Strengthening these aspects is essential for helping learners move beyond basic recall and develop higher-order thinking skills necessary for deep understanding and knowledge application.

This instructional material is designed to systematically support comprehension development, beginning with the Unpacking Diagram, which deconstructs content and performance standards to establish a framework

for acquisition, meaning-making, and transfer. This structured approach ensures alignment between learning objectives and instructional strategies. In the acquisition phase, the content standard is unpacked to derive competencies aligned with the Department of Education's Most Essential Learning Competencies (MELCs). The meaning-making phase involves formulating Essential Questions (EQs) and Enduring Understandings (EUs) that guide learners toward deeper comprehension and critical thinking. Finally, in the transfer phase, the performance standard is unpacked to design a culminating performance task, ensuring that students can apply their learning in real-world contexts.

This instructional material follows a structured, four-stage approach—Explore, Firm Up, Deepen, and Transfer—which progressively builds students' comprehension and analytical skills. Through this scaffolded learning process, students are encouraged to engage actively with texts, enhance their reasoning abilities, and develop a more profound and meaningful understanding of what they read.

Experts' Rating of the Instructional Material

Figure 2 presents the summary of ratings provided by the panel of experts before the revision stage. The Reading Instructional Material Design received a very good rating for its learning objectives, which were characterized as SMART—specific, measurable, attainable, relevant, and time-bound. These objectives were framed using observable behavioral terms and were appropriately aligned with the content.

Additionally, the instructional material was rated very good in terms of content, as it provided a clear and concise description of lessons aligned with the Department of Education's Most Essential Learning Competencies (MELCs). One of its strongest features was the variety of learning activities, which received an excellent rating. This indicates that the activities were well-suited to the target learners and designed to be engaging and child-friendly.

For the final two criteria, assessment strategy and format, the material was also rated very good. It effectively incorporated formative assessments and feedback mechanisms to support student learning. Furthermore, the visual design was found to enhance comprehension and was utilized effectively to foster a deeper understanding of the content.

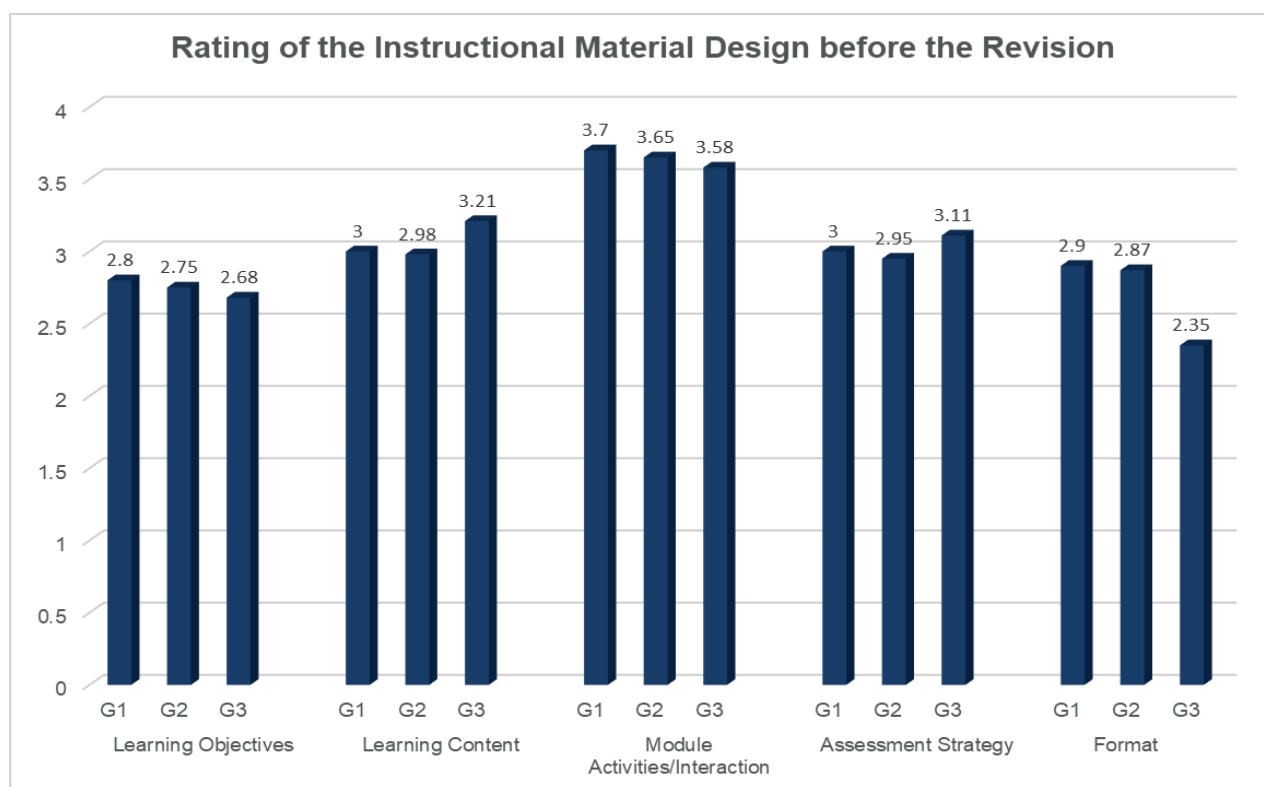


Figure 2. Rating Scale for the Instructional Material Design before the Revision

Scale used in rating:

1,00 - 1,54 Needs Improvement

1,75 - 2,49 Good

2,50 - 3,24 Very Good

3,25 - 4,00 Excellent

Figure 3 presents the summary of ratings given by experts after the revision stage, incorporating their comments and suggestions. The Reading Instructional Material Design received an excellent rating for its learning objectives, with its score increasing from 2,73 to 3,76, indicating a significant improvement. Similarly, the content rating rose from 3,06 to 3,74, also classified as excellent.

For module activities and interaction, the rating increased from 3,64 to 3,90, reflecting enhanced engagement and learner participation. The assessment strategy showed notable improvement, rising from 3,02 to 3,90, confirming its effectiveness in evaluating student progress. Lastly, the format received a final rating of 3,85, signifying excellence in its structure and presentation. These results indicate that the instructional material successfully met the specifications of an effective reading instructional design. Overall, the material achieved a total weighted average of 3,83, interpreted as excellent, confirming its exemplary quality in terms of learning objectives, content, activities, assessment, and format. The experts' evaluation affirmed that the Reading Instructional Material Design is ready for pilot testing and further proofreading. Thus, it is deemed suitable for use in teaching reading to primary graders in an online learning environment.

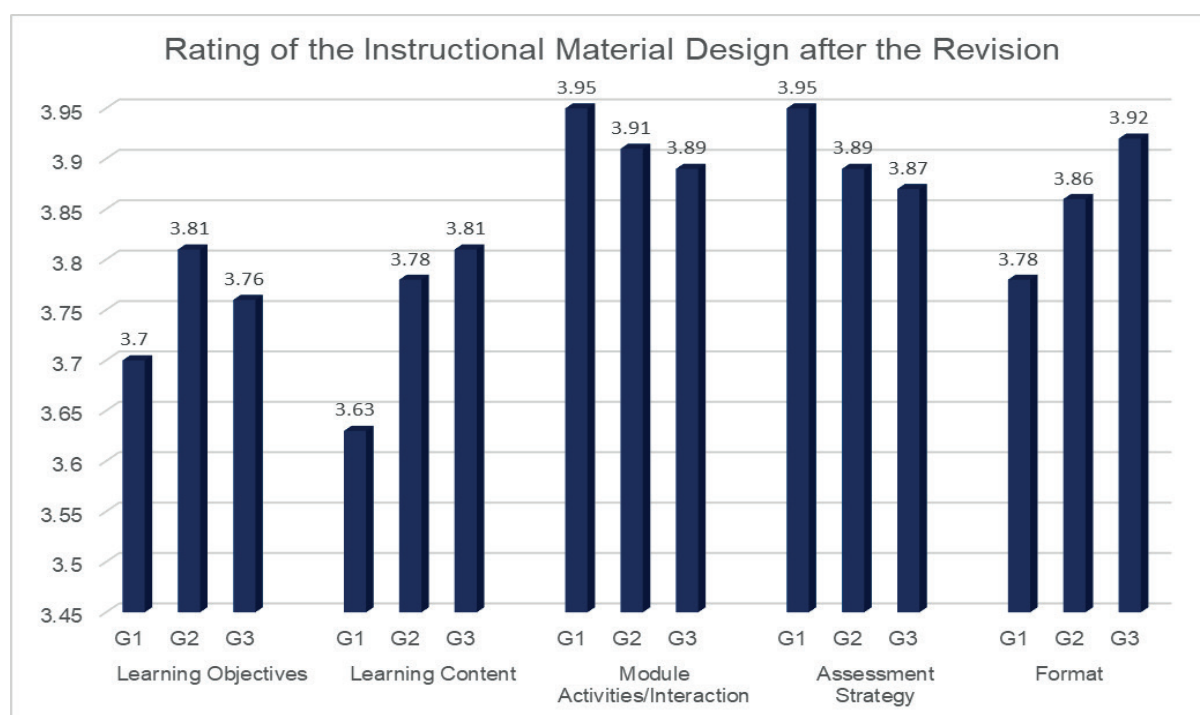


Figure 3. Rating Scale for the Instructional Material Design after the Revision

Comments and Suggestions of the Panel of Experts to the Reading Instructional Material Design

One of the components of evaluating the Reading Instructional Material Design was the rubric. This was done to gather more insights and comments to improve the teaching-learning material. The figures that follow show comments and suggestions of evaluating experts.

The table 4 presents expert feedback on various aspects of the *Reading Instructional Material Design*, highlighting areas of strength and recommendations for improvement. In terms of *Learning Objectives*, experts noted that the objectives were clear and attainable for both face-to-face and online learning; however, they emphasized the need for additional support during asynchronous activities. They also acknowledged that the objectives were specific and addressed different levels of learner thinking. Regarding *Learning Content*, the module effectively demonstrated the necessary competencies, yet some activities needed refinement to better align with Grade 1 pupils. Experts pointed out that while contextualized, some exercises contained an excessive number of word examples, which might cause confusion among learners.

For *Module Activities/Interaction*, the experts praised the interactive nature of the activities, particularly the use of videos, which they believed would appeal to tech-savvy children. They suggested incorporating more links to expand topics and including game-based or group activities to foster social interaction and friendship-building in a classroom environment. The *Assessment Strategy* was commended for aligning with session objectives and incorporating higher-order thinking skills (HOTS) to ensure deeper understanding and meaningful learning. Lastly, in terms of *Format*, the module was generally well-structured and beneficial for young learners. However, experts recommended improving the design and arrangement of activities to enhance their logical sequencing and ease of use. Overall, the feedback highlights the instructional material's strong

foundation while providing insightful suggestions for refinement to optimize its effectiveness for primary graders in an online learning setup.

Table 4. Changes in the Reading Instructional Material Design

| |
|---|
| <p>Comments/Suggestions:</p> <p>Learning objectives are both attainable and clear for both face-to-face and online method. But need to make sure that someone will assist them especially during asynchronous activities.</p> <p>The learning objective of the topic is specific and can help to address the different level of thinking of the learners.</p> <p>Learning Content</p> <p>The module is good in exhibiting the necessary competencies that need to be accomplished in every topic. But I need to make sure that activities should be fit with Grade 1 pupils.</p> <p>The module is based on the context but there are some activities that can make the learners confused because of too many examples of difficult words.</p> <p>Module Activities/Interaction</p> <p>The module activities are great and interactive. I think kids will enjoy navigating the videos since kids nowadays are techy and like watching those stuff to learn the topics</p> <p>I think kids will enjoy it more if you will provide more links that is related to the topics to expound the topic easily.</p> <p>Module activities are explicit and interactive. I think kids will enjoy answering it since it helps their cognitive skills improve.</p> <p>Next time make an activity like game based or by group that will help to develop the social interaction that can create a long-lasting friendship in a classroom environment.</p> <p>Assessment Strategy</p> <p>Good thing that assessment matches the objectives at the end of every session. Also, it provides HOTS questions to make sure that pupils understand the topic and most importantly, the essence of learning them.</p> <p>Format</p> <p>Overall, the module is great and has useful content for kids. But need to improve the design and arrangement of the activities to make sure that every detail is clear and enticing to the eyes of kids.</p> |
|---|

DISCUSSION

Research indicates a significant gap in the development of digital literacy skills among primary students, impacting their engagement and comprehension in reading activities conducted online. If not properly addressed, the introduction of digital technologies can negatively affect children's reading comprehension and critical thinking development.⁽¹⁸⁾ The shift to online learning has revealed that many young learners lack the necessary competencies for deep reading on screens, requiring educators to implement strategies that enhance digital comprehension skills.⁽¹⁸⁾ Moreover, the digital reading experience differs from traditional print reading. Studies show that the medium through which material is presented can alter reading behaviors and comprehension levels.⁽¹⁹⁾ While digital formats, such as e-books, offer immersive features like visual and auditory elements that may enhance reading stamina and vocabulary development,⁽²⁰⁾ concerns remain regarding how students process information differently on screens versus physical texts. Research suggests that children's comprehension and motivation in reading may be negatively affected when comparing digital reading to traditional print experiences.⁽²¹⁾

The pedagogical approaches used in online instruction also play a crucial role in shaping students' reading experiences. Effective strategies, such as digital reading check-ins, have been proposed to support independent reading on digital platforms for young learners. These check-ins help address both technological and pedagogical challenges in virtual learning environments.⁽²²⁾ In this regard, educators are encouraged to redefine their instructional objectives when utilizing online resources, ensuring that they cater to the diverse needs of students.⁽¹⁹⁾ This includes fostering robust discussion patterns and incorporating scaffolding techniques to improve comprehension during digital reading activities.⁽²³⁾

The COVID-19 pandemic further exacerbated reading challenges, contributing to a decline in foundational literacy and numeracy skills due to interrupted learning opportunities. Without intensive support in online settings, students' reading abilities have suffered, complicating their learning trajectories in primary education.⁽²⁴⁾ This highlights the urgent need for motivational strategies that engage students and foster a love for reading, especially in contexts where they may feel disconnected from traditional literacy practices.⁽²⁵⁾ While self-regulation challenges stand out as the most significant barrier to online reading comprehension, technological, social, and environmental factors also play a role, albeit to a lesser extent. Addressing these challenges requires a multifaceted approach, incorporating technological support, pedagogical adjustments, and self-regulated learning strategies. Given the long-term implications of digital literacy gaps, educators must

remain proactive in refining their teaching methodologies to optimize reading engagement and comprehension in online learning environments.

A significant determinant of reading comprehension is vocabulary knowledge. Research by Dong et al.⁽²⁶⁾ emphasizes that a comprehensive vocabulary framework is foundational for successful reading comprehension, asserting that vocabulary knowledge plays a pivotal role as students transition from learning to read to reading to learn during early education. Moreover, as students' progress in their educational journey, the emphasis on linguistic comprehension intensifies, indicating that interventions aimed at enhancing vocabulary should be prioritized to improve comprehension outcomes. In support of this, students who demonstrate a robust understanding of vocabulary are generally more adept at making sense of texts, leading to better comprehension results.⁽²⁶⁾

The home literacy environment also significantly impacts reading comprehension levels in primary education. A study conducted by Guzmán-Simón et al.⁽²⁷⁾ highlights how the characteristics of home literacy practices correlate positively with reading comprehension achievement among primary students. The study indicates that students from literacy-rich environments tend to perform better on reading assessments, thereby underscoring the role of parental involvement and resource availability in the development of literacy skills.

Effective teaching strategies that incorporate direct instruction and collaborative learning methodologies are crucial in fostering reading comprehension. The Multicomponent Reading Intervention highlighted by Daniel et al.⁽²⁸⁾ demonstrates how integrating various reading skills, including word reading, fluency, and comprehension strategies, can yield improvements in students' reading abilities. By adopting a holistic approach that emphasizes collaboration and active engagement, educators can enhance students' comprehension levels significantly, as evidenced by improved reading outcomes in intervention settings.^(28,29) Furthermore, research indicates that leveraging student interaction in learning processes contributes directly to enhanced comprehension skills, which is particularly beneficial for primary graders.⁽²⁹⁾

In addition to pedagogical approaches, individual factors like socioeconomic status also influence reading comprehension outcomes. Daniel et al.⁽³⁰⁾ exploration of rural school students reveal that disparities in academic language exposure and instructional quality often result in varied comprehension levels among students from diverse backgrounds. This highlights the necessity for tailored interventions that address specific challenges faced by students, particularly those in under-resourced educational settings.

CONCLUSIONS

This study abstracted the nature of reading comprehension and its challenges within an online learning context. It established the relationship between primary graders' cognitive performance and their learning environment during digital instruction. From this perspective, instructional design becomes a transformative tool for supporting reading development. A thoughtfully structured intervention, grounded in observed learner needs, facilitates a responsive approach to literacy education in virtual settings. The findings affirm the importance of pedagogical adaptability, cognitive scaffolding, and material alignment in sustaining comprehension growth. Instructional innovation must remain rooted in both developmental appropriateness and contextual relevance to ensure continuity and equity in foundational literacy.

RECOMMENDATIONS

Based on the findings of this study, several key recommendations are proposed to enhance the online reading experience and comprehension of primary graders.

First, the study identified Technological Literacy and Competency Challenges (TLCC) and Learning Environment Challenges (LEC) as the most significant barriers to online reading instruction. To address these issues, collaboration among key stakeholders—including parents, teachers, school leaders, government education agencies, and the broader community—is crucial. Schools should develop and continuously refine school-based learning continuity plans to minimize disruptions caused by crises such as the COVID-19 pandemic. These plans should include structured support systems to assist young learners in navigating online learning effectively.

Second, the study highlighted that while primary graders excel in literal comprehension, they require further development in interpretative, evaluative, and creative comprehension skills. Teachers are encouraged to implement evidence-based instructional methodologies and strategies that foster higher-order thinking skills. Interactive learning activities, critical reading tasks, and discussion-based approaches should be integrated into online reading instruction to enhance students' ability to analyze, evaluate, and apply information meaningfully.

Lastly, the Reading Instructional Material Design developed in this study should undergo pilot testing, evaluation, and refinement. It should be disseminated to educators for review, with proofreading and enhancements made as needed—including improvements in content, visual design, and usability—to ensure its effectiveness for primary learners. Adjustments should be made to align with students' developmental levels and learning capacities. Since this instructional material incorporates innovative and engaging activities, its successful implementation has the potential to significantly improve students' reading comprehension in an online learning environment.

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CONFLICT OF INTEREST

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