The Impact of Digital Educational Materials on Learner Engagement Among Grade 6 Learners

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Abstract — This study examined the relationship between the use of Digital Educational Materials (DEMs) and learner engagement among Grade 6 learners in selected hinterland public elementary schools in Siocon District, Division of Zamboanga del Norte. A quantitative correlational research design was employed involving 112 Grade 6 pupils. Data were gathered using a researcher-developed questionnaire that measured the frequency of DEM use and learner engagement across three dimensions: intrinsic motivation, active participation, and collaboration. Descriptive statistics indicated that Digital Educational Materials were frequently used in classroom instruction. However, regression analysis revealed that the use of DEMs did not significantly predict intrinsic motivation, active participation, or collaboration among learners. The findings suggest that the presence and frequency of digital instructional materials alone may not be sufficient to produce measurable improvements in learner engagement. These results emphasize that learner engagement may be influenced by broader instructional and contextual factors beyond the mere availability or use of digital tools. The study highlights the need to examine pedagogical approaches and contextual conditions when integrating digital educational resources in rural and resource-constrained educational environments.

Keywords: Digital Educational Materials, learner engagement, intrinsic motivation, active participation, collaboration, rural schools

I. INTRODUCTION

The integration of digital technologies has increasingly influenced contemporary educational practices, particularly in enhancing instructional delivery and learner engagement. Digital Educational Materials (DEMs) provide teachers with diverse instructional resources such as multimedia presentations, educational videos, simulations, and interactive modules that can

support different learning preferences. These digital resources allow teachers to present lessons in more engaging formats that promote active participation and sustained attention among learners. Research suggests that well-designed digital learning materials can enhance learner motivation and engagement by presenting instructional content in interactive and accessible ways (Kormos & Wisdom, 2021).

Digital Educational Materials refer to technology-based instructional resources that support the teaching and learning process through digital platforms and multimedia tools. Examples of DEMs include e-books, interactive learning applications, gamified learning modules, and multimedia presentations that enable learners to access instructional content through multiple formats. According to multimedia learning theory, combining text, visuals, and audio within instructional materials can strengthen learners' comprehension and retention by aligning with cognitive processes involved in learning (Mayer, 2021). As digital technology continues to expand across educational settings, understanding how these materials influence learner engagement has become an important area of educational research (Sung et al., 2016).

Several features of digital educational materials contribute to meaningful learning experiences. Interactive components such as quizzes, simulations, and feedback mechanisms encourage learners to actively participate in instructional activities (Clark & Mayer, 2016). Multimedia elements including visuals, animations, and audio presentations can also sustain learners' attention and address diverse learning preferences (Mayer, 2021). In addition, digital tools may support collaborative learning by enabling learners to communicate, share ideas, and complete tasks together through technology-supported environments. Engagement Theory further emphasizes that meaningful learning occurs when learners participate in interactive and collaborative tasks supported by technology (Kearsley & Shneiderman, 1998).

learner engagement remains limited in rural and resource-constrained educational environments. Many existing studies have focused on technology-rich settings where access to digital infrastructure and instructional resources is readily available (Buabeng-Andoh, 2022; Sung et al., 2016). In contrast, hinterland schools often experience challenges such as unstable electricity, limited internet connectivity, and restricted access to digital devices. These conditions may influence how digital resources are implemented and how learners interact with them during classroom instruction (Buabeng-Andoh, 2022; Ju-Zaveroni & Lee, 2023).

Given these contextual realities, it is important to examine how digital educational materials function in geographically isolated educational settings. Grade 6 learners represent an appropriate group for investigating this relationship because they are preparing for the academic demands of secondary education and possess increasing readiness to engage with technology-mediated learning environments (Cahyani, 2025). Therefore, this study investigates the relationship between the use of Digital Educational Materials and learner engagement among Grade 6 learners in selected hinterland public elementary schools. Specifically, the study focuses on three dimensions of engagement—intrinsic motivation, active participation, and collaboration—to provide context-specific insights that may inform the effective integration of digital learning resources in rural education.

Literature Review

Digital Educational Materials (DEMs) have increasingly become important tools in contemporary classroom instruction. These materials include multimedia presentations, digital modules, educational videos, and interactive learning platforms designed to support technology-enhanced teaching and learning. Research suggests that multimedia-based instructional materials can improve learners' understanding by presenting information through integrated visual and verbal channels that facilitate cognitive processing (Mayer, 2021).

The integration of digital learning resources has also been associated with more interactive and learner-centered instructional practices. Digital tools enable teachers to present content in varied formats and provide opportunities for learners to engage actively with instructional materials. Clark and Mayer (2016) emphasize that well-designed multimedia instruction can enhance learning by combining visual and auditory elements that support comprehension and retention of information.

In many educational contexts, the adoption of digital educational materials has expanded in response to technological advancements and the increasing demand for flexible learning resources. However, the implementation of digital technologies varies significantly across schools, particularly between urban and rural environments. Schools located in rural and geographically isolated areas often experience limitations in infrastructure, internet connectivity, and access to

digital devices, which can affect how digital instructional resources are utilized in classroom instruction (Buabeng-Andoh, 2022).

Learner engagement is widely recognized as a key factor influencing successful learning outcomes. Engagement reflects the degree to which learners actively participate in the learning process and demonstrate interest in academic activities. According to Fredricks, Blumenfeld, and Paris (2004), learner engagement is a multidimensional construct consisting of behavioral, emotional, and cognitive components that collectively influence students' involvement in learning tasks.

Technology integration is often viewed as a strategy to enhance learner engagement in the classroom. Engagement Theory proposed by Kearsley and Shneiderman (1998) suggests that learning becomes more meaningful when learners are actively involved in collaborative and technology-supported activities that require interaction and participation. Through digital tools, learners can participate in interactive tasks, communicate with peers, and explore instructional content in more dynamic ways.

Despite the potential benefits of digital learning technologies, some researchers caution that the presence of digital tools alone may not guarantee increased engagement. The effectiveness of digital materials depends on how they are integrated into instructional practices and how teachers facilitate meaningful learning experiences. Consequently, the impact of Digital Educational Materials on learner engagement may vary depending on contextual factors, instructional design, and the availability of technological resources.

II. METHODOLOGY

Research Design

This study utilized a quantitative correlational research design to examine the relationship between the use of Digital Educational Materials (DEMs) and learner engagement among Grade 6 pupils. A correlational approach was appropriate for the investigation because it sought to determine whether the use of DEMs is significantly associated with learner engagement, with

DEM use treated as the independent variable and intrinsic motivation, active participation, and collaboration treated as the dependent variables.

The research design allowed for the examination of naturally occurring relationships among variables without manipulating instructional conditions. Regression analysis was employed to determine whether the use of Digital Educational Materials could predict learner engagement while maintaining the natural classroom setting.

Research Environment

The study was conducted in selected public elementary schools located in the hinterland areas of Siocon District, Division of Zamboanga del Norte (see Figure 2). These schools were selected because they reported the integration of Digital Educational Materials (DEMs), such as preloaded instructional videos, PowerPoint presentations, digitized modules, and offline learning platforms, in their classroom instruction.

The research setting is characterized by geographical isolation and infrastructural limitations that directly influence instructional practices. The participating schools are situated in remote communities where road access becomes challenging, particularly during periods of heavy rainfall. Landslides, fallen trees, and road obstructions frequently disrupt transportation and access to external services. Internet connectivity is unstable and primarily dependent on mobile data signals. During adverse weather conditions, cellular signal strength weakens, and mobile data connectivity may become unavailable. Furthermore, electricity supply in the area is not consistently stable, and occasional power interruptions affect the continuous operation of digital devices used for instruction.

These contextual realities significantly shape how Digital Educational Materials are implemented in the participating schools. Unlike urban or technology-rich educational environments that rely on real-time online platforms, the integration of DEMs in this setting is largely dependent on offline or pre-downloaded resources. Teachers prepare digital instructional materials in advance and store them on laptops, USB drives, or mobile phones to ensure continuity of instruction despite connectivity constraints. In many households and within the school community, mobile phones serve as the primary device for accessing digital content. As such, the

use of Digital Educational Materials in these schools reflects adaptive instructional practices rather than dependence on high-speed internet infrastructure.

The uniqueness of this research environment lies in its representation of a resource-constrained educational context where digital integration occurs under infrastructural limitations. While much of the existing literature on Digital Educational Materials has focused on urban or well-resourced schools, this setting provides an opportunity to examine whether the use of DEMs can meaningfully relate to learner engagement within marginalized and geographically isolated communities. The environment therefore offers context-specific evidence regarding how technology-mediated instruction functions when access to advanced digital infrastructure is limited.

The selection of these schools aligns with the premises of Engagement Theory (Kearsley & Shneiderman, 1998), which emphasizes that meaningful learning occurs when learners are actively involved in purposeful and collaborative activities supported by technology. In this context, engagement is not determined by the sophistication of technological infrastructure but by how available digital resources are utilized to support instructional goals. Examining learner engagement within this rural and hinterland environment allows the study to assess whether the presence and use of Digital Educational Materials—despite infrastructural constraints—are associated with intrinsic motivation, active participation, and collaboration among Grade 6 learners.

Thus, the research environment provides a theoretically and contextually appropriate setting for investigating the relationship between Digital Educational Materials and learner engagement in rural elementary schools where technology integration is shaped by both pedagogical adaptation and infrastructural realities.

Respondents and Sampling

The population of this study consisted of 114 Grade 6 pupils from seven public elementary schools located in the hinterland areas of Siocon District (see Table 1 for school-level distribution). Given the relatively small population size and the appropriateness of including all eligible participants, the study employed a census sampling approach. All Grade 6 pupils who were

officially enrolled in the identified schools and present during the data collection period were invited to participate in the study.

During the actual data gathering procedure, only 112 out of the 114 identified Grade 6 pupils were available and able to participate. Two pupils were absent at the time of data collection and were therefore excluded from the final sample. As a result, the study's final number of respondents consisted of 112 Grade 6 learners.

Research Instrument, Validation, and Reliability

Two instruments were utilized to collect the data for this study. The first was a researcher-developed questionnaire constructed based on a review of related literature. This instrument measured the frequency of learners' use of Digital Educational Materials (DEMs) using a four-point Likert scale. The items represented commonly utilized forms of DEMs, including educational videos, e-books, interactive quizzes, multimedia presentations, online learning platforms, and other digital tools identified in previous studies.

Learners indicated how often each type of digital material was used during classroom instruction and identified the availability of these resources in their learning environment. This component addressed the first research problem concerning the extent of DEM use in students' lessons.

The second instrument, the Learner Engagement with Digital Educational Materials Questionnaire, measured learner engagement across three dimensions: intrinsic motivation, active participation, and collaboration. The instrument consisted of 15 items, with five statements representing each dimension. Responses were recorded using a five-point Likert scale.

The questionnaire included both positive and negative worded items. Negatively stated items were reverse-scored prior to analysis to maintain consistent scale direction. Responses were recoded so that higher scores uniformly reflected higher levels of learner engagement. Composite scores for each engagement dimension were computed after recording.

Together, the two instruments enabled the examination of both the extent of Digital Educational Material use and its relationship with learner engagement among Grade 6 learners in selected hinterland schools.

Validation. For content validity, the instrument was evaluated by three experts in the field of education and educational research. The experts assessed the questionnaire in terms of clarity, relevance, and alignment with the objectives of the study. The computed Content Validity Index (CVI) values were 0.90 for intrinsic motivation, 0.933 for active participation, and 0.933 for collaboration, with an overall CVI of 0.92. These results indicate that the instrument demonstrated excellent content validity, confirming that the items were relevant and representative of their respective constructs. The detailed computation of the CVI is presented in Appendix A.

Reliability. Following the validation process, the questionnaire was pilot-tested among 30 learners who were not included in the actual respondents of the study. The pilot testing aimed to determine the internal consistency of the instrument. The computation of the reliability coefficients using Cronbach's alpha was conducted by a statistician from Jose Rizal Memorial State University, who also issued a certification of reliability. The obtained reliability coefficients were 0.782 for the type of Digital Educational Materials, 0.829 for intrinsic motivation, 0.785 for active participation, and 0.833 for collaboration. These values indicate acceptable to good internal consistency across all subscales, confirming that the instrument was statistically reliable for use in the study. The certification of reliability results is presented in Appendix B.

Research Procedures

The study was conducted through a systematic sequence of procedures to ensure methodological rigor, accuracy of data collection, and adherence to ethical research standards. Prior to the implementation of the study, formal approval to conduct the research was obtained from the Schools Division Superintendent of Zamboanga del Norte, the District Supervisor of Siocon District, and the school heads of the selected hinterland public elementary schools. Upon securing permission, the researcher finalized the research instruments, which consisted of a

researcher-developed checklist measuring the frequency of Digital Educational Material use and a learner engagement questionnaire assessing intrinsic motivation, active participation, and collaboration. The instruments underwent content validation by field experts and pilot testing to establish reliability prior to actual administration.

The respondents of the study were Grade 6 pupils enrolled in the selected hinterland schools. A census sampling approach was employed due to the manageable size of the population. All eligible learners who were officially enrolled, present during the data collection period, and granted parental consent were invited to participate in the study. Out of the identified population, 112 learners were present and completed the questionnaires, forming the final sample.

Before administering the instruments, the researcher conducted an orientation session to explain the purpose of the study, the procedures involved, and the voluntary nature of participation. The explanation was delivered in language appropriate to the learners' level of understanding to ensure clarity. Learners were informed that their responses would remain confidential and that they could withdraw from participation at any time without academic consequences.

Data collection was carried out during regular class hours using printed questionnaires. Standardized instructions were provided to all respondents to maintain uniformity in administration. The presence of class advisers during the distribution and retrieval of the instruments ensured proper supervision and an organized data collection process. Completed questionnaires were immediately collected and reviewed for completeness.

Following data collection, the responses were coded and encoded into statistical software for analysis. Descriptive statistics, including frequency counts, means, and standard deviations, were computed to determine the extent of Digital Educational Material use and the levels of learner engagement across the identified dimensions. Inferential statistical analysis, specifically regression analysis, was conducted to examine whether the use of Digital Educational Materials significantly predicted intrinsic motivation, active participation, and collaboration among learners.

The analyzed data were subsequently interpreted in alignment with the research objectives and theoretical framework of the study. The results formed the basis for the conclusions drawn and the recommendations proposed regarding the integration of Digital Educational Materials in rural and hinterland elementary school settings.

Ethical Considerations

The study adhered to established ethical standards for research involving human participants. Prior to data collection, formal permission to conduct the study was secured from the Schools Division of Zamboanga del Norte, the District Supervisor of Siocon District, and the school heads of the participating hinterland schools.

The purpose, objectives, procedures, and expected outcomes of the study were explained to the learners using language appropriate to their level of understanding. Verbal assent was obtained from the Grade 6 learners before the administration of the questionnaires. Participation in the study was strictly voluntary, and learners were informed of their right to decline participation or withdraw at any stage of the research process without any form of penalty or academic consequence.

To ensure confidentiality and anonymity, identification codes were used in place of names in all research instruments and reports. The data collected were used solely for academic purposes and were stored securely, with access limited to the researcher and the research adviser. Appropriate measures were taken throughout the conduct of the study to protect participants from any form of physical, emotional, or psychological harm.

Verbal assent was considered appropriate given that the participants were elementary learners in rural school settings. The data collection process was conducted in the presence of class advisers to ensure proper supervision and to provide a supportive and child-friendly environment. This procedure ensured that participation was voluntary, informed, and culturally appropriate while upholding ethical standards in educational research.

The study also complied with the provisions of the Data Privacy Act of 2012 (Republic Act No. 10173) and was guided by the ethical principles of respect for persons, beneficence, and justice as articulated in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

III. RESULTS AND DISCUSSION

The findings of the study indicate that Digital Educational Materials were frequently integrated into classroom instruction across the participating schools. The descriptive findings indicate that teachers regularly incorporated digital resources such as instructional videos, multimedia presentations, and digitized learning materials in their teaching practices. This suggests that despite infrastructural and connectivity limitations commonly experienced in hinterland schools, teachers have adopted digital resources as part of their instructional strategies.

From the perspective of Engagement Theory (Kearsley & Shneiderman, 1998), technology integration is expected to support meaningful learning experiences by encouraging interaction, participation, and collaboration among learners. The frequent use of Digital Educational Materials observed in this study reflects efforts by teachers to integrate available technological resources into classroom instruction. In rural educational environments where technological infrastructure is limited, the presence of digital instructional materials indicates adaptive instructional practices aimed at enhancing the learning process.

However, the regression analyses showed that the use of Digital Educational Materials did not significantly predict intrinsic motivation, active participation, or collaboration among the Grade 6 learners. The statistical results indicated that the relationship between DEM use and the engagement dimensions examined in this study was not statistically significant, and the proportion of variance explained by the independent variable was minimal. These findings suggest that the frequency of Digital Educational Material use alone did not account for measurable differences in learner engagement outcomes.

This finding may indicate that the mere presence or frequent use of digital resources does not automatically translate into higher levels of learner engagement. Engagement Theory emphasizes meaningful interaction, collaboration, and purposeful activities supported by technology. Therefore, the effectiveness of digital tools in promoting engagement may depend not only on their availability or frequency of use but also on how these tools are integrated pedagogically within the learning process.

Similarly, when viewed through the lens of the Multidimensional Engagement Model (Fredricks et al., 2004), learner engagement consists of behavioral, emotional, and social

components represented in this study by active participation, intrinsic motivation, and collaboration. The absence of significant predictive relationships suggests that the frequency of DEM integration did not directly influence these engagement dimensions within the parameters measured in this research.

Given the correlational design of the study and the operationalization of DEM use primarily in terms of frequency, the findings suggest that digital materials functioned as instructional support tools rather than as independent predictors of engagement outcomes. Other contextual and instructional factors not examined in this study may play a more influential role in shaping learner engagement in rural classroom settings.

IV. CONCLUSION

This study examined the extent of use of Digital Educational Materials and their relationship with learner engagement among Grade 6 learners in selected hinterland public elementary schools in Siocon District. The findings indicated that Digital Educational Materials were frequently used during classroom instruction.

However, the statistical analyses revealed that the frequency of DEM use did not significantly predict intrinsic motivation, active participation, or collaboration among learners. Based on these findings, it can be concluded that while Digital Educational Materials were integrated into instructional practices, their frequency of use alone did not significantly account for differences in learner engagement within the context of this study.

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