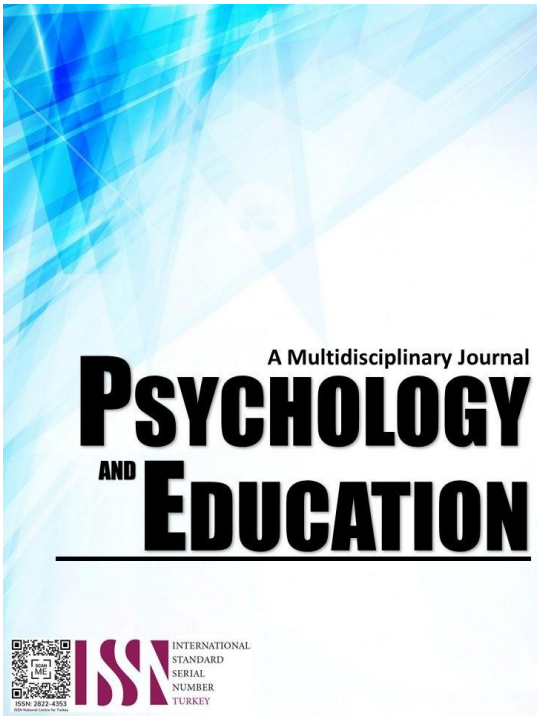
INTEGRATING OF DIGITALIZATION STRATEGIES IN IMPROVING LEARNERS READING COMPREHENSION



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Research Article

Integrating of Digitalization Strategies in Improving Learners Reading Comprehension

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Abstract

This study investigated the efficacy of integrating digitalization in improving reading comprehension among Grade VI learners at Lilod Raya Pilot Elementary School, Balindong District I, Division of Lanao Del Sur I, during the School Year 2024-2025. Utilizing a one-group pretest-posttest experimental design, the research aimed to determine whether the integration of digitalization method, combined with technology-enhanced instruction, significantly impacted students' reading proficiency. A total of 32 Grade VI learners participated in the study and were assessed using the Philippine Reading Inventory (Phil-IRI) before and after the intervention.The pretest results revealed that a majority of students were performing at the instructional level, requiring a teacher guidance to comprehend reading materials. Notably, more than two-thirds of the learners were classified under the frustration level, indicating substantial challenges in reading capabilities. Following the AMD intervention, a marked improvement was observed in posttest results. All students progressed beyond the frustration level, with fifty percent at the instructional level. Statistically analysis using paired sample t-test indicated a significant increase in mean scores, signifying statistical significance at the 0.01 level. Additionally, the effect size reflected a large scale practical impact, affirming the educational relevance of the results. The findings suggested that the AMD approach was an effective instructional strategy for enhancing reading comprehension and advocate for its continued application and potential scaling in similar educational context.

Keywords: *differentiated instruction, reading comprehension, AMD (Advanced Methodologies through Digitalization), Phil-IRI, pretest-posttest design*

Introduction

As a teacher of Alpha Generation students, learners tend to be bored and passive in class as they use the traditional way of learning -- the paper-and pencil. Such that, it is a challenging part for the teacher to use technology in his instruction that technology is limited or inaccessible in rural area. Teachers lacking of projector, monitor, etc. has difficulty to inculcate what technology can offer. Since then, teachers in rural uses the traditional (subject-centered) way of teaching. Thus, the performances of the learners seem low in terms of attending entrance exams in junior high school.

However, the generation aged 3 and above are capable using technology like the cellphone. Even three years old can browse a cellphone watching a video, TikTok, and reels in Facebook. How about 10-12 years old kids? They are much equipped or expert in cellphone application. Thus, their mind revolves in internet, technology, gadgets and so on. So, this, the researcher would like to use technology as instruction to see its effectiveness in gaining great performance of the Grade VI learners of Lilod-Raya Pilot Elementary School.

The Department of Education issues Revised Guidelines on the implementation of the DepEd Order No. 016, s. 2023. It aims to provide public schools and DepEd offices with appropriate, quality, and equitable technologies. This would enhance the teaching, learning, governance, and process; practices, programs, and policies to meet the challenges of the modern age.

According to Lachner (2024), integrating technology into the classroom is a crucial and difficult task that prepares students for life in the digital age. Furthermore, technology-based learning and education are more effective than traditional classroom settings. This is because, as stated by Ghaifeur and Rosdy (2019), using ICT tools and equipment will give both teachers and students a stimulating and effective learning environment. Incorporating technology into the classroom can enhance instruction, provide a dynamic and captivating learning environment, and maintain student motivation (Akram et al., 2022).

Emerging technologies can potentially transform education through student engagement (Maricic, 2024). In technology integration vests teachers to create highly engaging, fruitful, and effective learning lessons (Islam et al., 2019). As stated by the U.S. By adding useful digital tools to the classroom, broadening the range of courses offered, boosting student engagement, and speeding up learning, educational technology can help schools enhance teaching and learning, according to the Department of Education. Moreover, the influence of technology integration on teacher performance and student engagement is significantly high with the mediation of teacher learning and pedagogical strategies (Panakaje, 2024).

The main objective of the study was to determine the effectiveness of technology instruction in students learning outcomes in teaching Grade IV. The study was conducted at the last quarter in teaching English IV learners. The researcher would like to achieve new level of productivity, implement useful digital tools to expand learning opportunities for students, and increase learners support and engagement.

Research Objectives

This study aimed at determining the efficacy of technology integrated instruction in learning English reading. Specifically, the study sought to attain the following objectives:

1. To determine the pretest scores of the respondents before using ADM integration in reading.
2. To determine the posttest scores of the respondents after the integration of ADM.
3. To determine the significant differences between pretest and post test results of the participants.
4. To evaluate the gain score of pretest and posttest results.
5. To craft Learning Development plan based on the findings of the study.

Methodology

Research Design

This study used the one group pretest-posttest research design. The basic premise behind the pretest-posttest design involved by giving a pretest measurement prior the administering of some treatment, followed by a posttest on the same measurement after treatment occurred. A single group of learners took the Phil-IRI reading comprehension test before and after the ADM conducted as an intervention to determine any changes in their reading comprehension. This is in contrast to conventional quasi-experimental design that have the district control and experimental groups. At the end of the data gathering period, the learners' Phil-IRI scores were examined to determine the effectiveness of the so-called ADM strategy by comparing their Phil-IRI pre and posttests scoring.

Respondents

The participants of the study were the Grade VI learners of Lilod-Raya Pilot Elementary School. The researcher utilized the 32 learners as participants. The researcher utilized the PHIL-IRI selection as the reading instrument for the conduct of the pretest and posttest. Before executing technology integration in class, the participants were given pretest. Meanwhile, posttest was given after.

By selecting all Grade VI learners, the study did not require additional sampling from a broader pool, making it both time efficient and logistically feasible. The use of cluster sampling was further justified as it ensured that the study captured the perspective of all available Grade 6 learners, providing a comprehensive view of this specific group at the school.

Instrument

The study utilized the Phil-IRI passages intended for Grade VI learners as a tool in evaluating the reading comprehension of the participants. This tool was already standardized and did not require pilot testing. Contents of the pretest and posttest are English VI competencies as required by the K-to-12 English Curriculum for Grade VI. The type of test is a multiple choice composing of 40 items. Each item had four choices for the correct answer. The pretest was conducted to assess the knowledge of the subjects before the application of the treatment (AMD integration). To measure the subjects' knowledge achievement after the application of the treatment, a posttest with similar contents of the pretest was administered. The questionnaire was presented to the adviser for correction before they were administered to the subjects.

Data Analysis

The analysis of data collected in this study utilized robust statistical techniques to address the various research objectives presented in the study.

For objectives 1 and 2, frequency percentage was used to determine the pretest and posttest scores of the participants before and after utilizing the ADM strategy. This provided an overview of the average performance levels before and after the intervention.

For objective 3, a paired T-test was utilized to determine whether there were significant differences between the pretest and posttest scores of the participants and to analyze the variations between these scores.

For objective 4, mean and standard deviation was used to evaluate the gain score of pretest and posttest results.

These statistical methods facilitated a comprehensive understanding of the data and enabled the researcher to make insightful judgments about the effectiveness of the AMD strategy.

Ethical Considerations

Generally, the best practices in research ethics were observed in the conduct of this study. Participants were not forcibly asked to answer all parts of the pre-posttest, instead they were allowed to decline from providing answers on items that they may find it difficult. Fortunately, however, none of them declined. Having answered such items respondents were given assurance that everything shall be kept with utmost secrecy and confidentiality. Using the SPC Free Prior Informed Consent Form, participants' free consent to participate in the study was requested prior to answering the pre-posttest.

To ensure the accuracy of the responses, the respondents were given ample time to answer the pre-posttest. This study strictly adhered

to all relevant provisions stipulated in Republic Act No. 10173 otherwise known as the Data Privacy Act of 2012. As provided in this law, anonymity, privacy, and confidentiality would be observed and individual responses/information would not be disclosed and divulged to protect the rights of every respondent.

Results and Discussion

Pretest Scores of the Participants before using ADM Integration in Reading

Table 1. *Distribution of the Pretest Scores of the Respondents Before using ADM Integration in Reading*

Pretest Scores	*Level*	*Frequency*	*Percentage (%)*
89%- below	Frustration	9	32.1
90%-96%	Instructional	17	60.7
97%-100%	Independent	2	7.1
Total		28	100.0

Note: Mean (SD) = 15.57 (5.09)

Table 1 shows the distribution of pretest scores among participants before the integration of the AMD (Advanced Methodologies through Digitalization) in reading instruction. The majority of the students (60.7%) scored within the instructional level range (14–27), indicating that most learners required teacher guidance to comprehend reading materials at the time of the assessment. A significant portion of students (32.1%) fell within the frustration level (1–13), suggesting they struggled considerably with reading and may have experienced difficulty understanding texts without significant support. Only a small percentage (7.1%) demonstrated independent reading proficiency (28–40), which reflects a limited number of students capable of comprehending reading materials on their own.

The overall mean score of 15.57, with a standard deviation of 5.09, further supported the interpretation that the reading proficiency of the group leaned towards the lower end of the scale, hovering just above the frustration level. These results underscored a pressing need for targeted intervention strategies to enhance reading comprehension skills among students. The high percentage of learners in the instructional and frustration levels highlights the importance of implementing more adaptive and supportive teaching approaches, such as ADM, to meet diverse learning needs and help students progress toward independent reading proficiency. These findings suggested that prior to ADM integration, students required substantial instructional support, reinforcing the necessity of differentiated and learner-centered instructional models in reading education.

The integration of technology in language learning can have a profound impact on the development of various language skills. For reading and writing skills, technology offers a wealth of digital resources, including e-books, online articles, collaborative writing platforms, and automated feedback tools (Dudley, 2020).

Posttest Scores of the Participants after Implementing with ADM

Table 2. *Distribution of the Posttest Scores of the Respondents After using ADM Integration in Reading*

Posttest Scores	*Level*	*Frequency*	*Percentage (%)*
89%- below	Frustration	0	0.00
90%-96%	Instructional	14	50.0
97%-100%	Independent	14	50.0
Total		28	100.0

Note: Mean (SD) = 24.86 (5.77)

Table 2 reflects the distribution of posttest scores after the integration of ADM (Approaches to Differentiated Methods) in reading, indicating a notable improvement in students' reading proficiency. Unlike the pretest results, none of the respondents scored within the frustration level (1–13), which suggests that all students progressed beyond the stage of struggling significantly with reading comprehension. An equal number of students (50.0%) reached the independent level (28–40), demonstrating the ability to understand reading materials without assistance, while the remaining 50.0% remained within the instructional level (14–27), still requiring some guidance but showing marked progress.

The increase in the overall mean score to 24.86, compared to the pretest mean of 15.57, with a slightly higher standard deviation of 5.77, further supported the effectiveness of ADM integration. This substantial gain in average performance indicates that differentiated instruction methods positively impacted the students' reading outcomes by addressing individual learning needs and promoting more effective engagement with reading materials.

The implications of these results are significant for Instructional planning and pedagogy. The complete elimination of frustration-level readers and the rise in independent readers highlight the value of integrating adaptive, student-centered approaches like ADM in reading instruction. This shift suggested that with the right strategies and support, learners can make considerable strides in their reading abilities. Educators and curriculum planners should consider adopting or expanding ADM-based practices to foster higher levels of reading proficiency and to ensure that students are equipped with the skills necessary for academic success and lifelong learning.

In a 2020 newspaper story titled "How instructional technology can improve the learning process," the function of technology in the contemporary classroom was mentioned. The use of technology in education is essential. In and out of the classroom, students use

paper and pencil for less than 42 percent of their work, according to a recent survey by MidAmerica Nazarene University. The study also found that 73% of teachers reported that their kids use computers or tablets on a daily basis.

Differences between Pretest and Post test Scores of the Participants

Table 3. *Analysis of the Differences between Pretest and Posttest Results of the Participants*

Paired Variable	*Mean*	*SD*	*t-value (df)*	*p-value*	*Remark*	*Effect size*
Pretest	15.57	5.09	-12.707** (27)	0.001	Significant	0.857
Posttest	24.86	5.77				

*Note: **significant at 0.01 level (2-tailed)*

The t-test analysis presented in Table 3 reveals a statistically significant difference between the pretest and posttest scores of the participants following the integration of ADM (Approaches to Differentiated Methods) in reading instruction. The mean score increased from 15.57 (SD = 5.09) in the pretest to 24.86 (SD = 5.77) in the posttest, resulting in a t-value of -12.707 with 27 degrees of freedom and a p-value of .000. This highly significant result ($p < 0.01$) indicated that the improvement in reading performance was not due to chance and can be attributed to the intervention.

Moreover, the effect size of 0.857 suggests a large practical impact of ADM integration on students' reading outcomes. According to Cohen's guidelines, an effect size above 0.8 is considered large, which implied that the change in scores represented a substantial educational improvement. This strong effect confirms that the intervention had a meaningful and positive influence on students' reading comprehension abilities.

The implications of this finding are noteworthy for educators and school administrators. The significant increase in scores, combined with a large effect size. It demonstrated that ADM is an effective instructional approach for improving reading skills, particularly in diverse classrooms where learners have varying needs and abilities. This supported the adoption and continued implementation of differentiated instruction strategies as a means of promoting equitable learning outcomes and elevating student performance. Overall, the results underscore the potential of ADM to transform reading instruction and foster greater academic achievement among students.

Technology integration is seen as an important and challenging endeavor to improve learning and get students ready to engage in a digital world (Lachner, 2024). Furthermore, compared to a typical classroom, technology-based instruction and learning are more successful. This is because, according to Ghaifeur and Rosdy (2019), employing ICT tools and equipment would provide an engaging and productive learning environment for both teachers and students. Technology integration in the classroom has the potential to improve instruction, provide a lively and engaging learning environment, and sustain student motivation (Akram et al., 2022).

Similarly, technology in education has advantages (Delgado et al., 2019). Furthermore, it was demonstrated by Macho (2005) that integrating ICT into the classroom would improve student learning. Nonetheless, the majority of educators in this survey concur that ICT enhances classroom management since it makes pupils more attentive and well-behaved. This study demonstrated that because ICT-enhanced lessons are more captivating and engaging, pupils learn more efficiently. In light of this, the panelists concurred that incorporating ICT can improve students' learning.

Gain Score of Pretest and Posttest Results

Table 4. *Gain Score*

Test	*Mean score*	*Standard Deviation*
Pretest	15.57	5.09
Posttest	24.86	5.77

The gain score was computed to measure improvement made by the participants. The formula used for the gain score is : Gain Score=Posttest Score - Pretest Score. The average gain score obtained was 9.29, suggested a positive impact. Since the mean score increased from 15.57 to 24.86, this reflected improvement. To assess the efficacy of ADM, a pretest was given followed by a posttest after the intervention. The table summarized the pretest and posttest mean scores and standard deviation.

Table 4 compared the pretest and posttest mean scores and standard deviation for the 32 participants. The mean pretest score was 15.57, with a standard deviation of 5.09, and the mean posttest score climbed to 24.86, with a standard deviation of 5.77. The computed gain score of 9.29 represented the average progress made by the participants following the integration of digitalization strategies learning intervention.

The statistics demonstrated a significant increased in the mean score, from 15.57 in the pretests to 24.86 in the posttest. The 9.29 point increase suggested that learners achieved meaningful development in their reading comprehension skill after the intervention. The high pretest standard deviation (5.09) indicated that learner's performance varies, with some scores much lower than others. However, the significantly smaller standard deviation in the posttest (5.77) showed that the scores became more consistent following the intervention, demonstrating that even the initially struggling learners were able to catch up with their classmates. The smaller spread in scores demonstrated the interventions' success in narrowing performance gaps among learners. These data suggested that integration of digitalization strategies in reading can improve both overall performance and equity in learning outcomes.

Furthermore, following the implementation of a digitalization strategy intervention, students' reading comprehension skills showed an increase in both the mean score and standard deviation, indicating a number of important implications that were both positive and cautionary. The following was listed by Celica and Keskin (2019): Positive Impact: Increased Mean Score. After the intervention, students generally fared better in reading comprehension, as shown by a higher mean score. This implied that student learning was probably improved by the digital approach. Intervention effectiveness: At least for the majority of pupils, the intervention seemed to have achieved its goal of improving comprehension abilities. Greater disparity in student performance is indicated by a higher standard deviation. Some kids might have improved significantly, while others might have declined or made little to no progress. Differentiated effectiveness: Some subgroups, including pupils who are already tech-savvy or motivated, may find the method more beneficial, while others may find it less effective—or even overwhelming. It's possible that the intervention unintentionally made already-existing gaps worse, particularly if it failed to take into consideration pupils with different learning styles or restricted access to technology.

Conclusions

Based on the analysis and findings of the study, the conclusions are stipulated below:

This study concludes that the integration of approaches to differentiated methods (ADM) in reading instruction is an effective pedagogical strategy for enhancing students' reading development. By addressing the varied learning needs of students through tailored instructional methods, ADM fosters a more inclusive and responsive learning environment that supports the progression of learners from teacher-dependent to more autonomous readers. The approach encourages active engagement and allows for personalized pacing, which helps build confidence and competence in reading. Also, the study highlights the importance of adopting innovative instructional frameworks like ADM in addressing long-standing challenges in literacy education. The success of this method suggests that schools and educators should consider embedding differentiated instruction into regular teaching practices to ensure sustained literacy growth. It also points to the need for ongoing professional development to equip teachers with the necessary skills and strategies to effectively implement ADM in diverse classroom settings.

Based on the conclusions of the study, several key recommendations are proposed for various stakeholders in the educational community.

For learners, it is encouraged that they actively participate in differentiated reading activities and utilize available ICT resources to support their independent learning. By embracing diverse strategies and tools, students can enhance their reading comprehension and become more self-directed learners. For teachers, it is recommended to continue integrating ADM in reading instruction while also seeking opportunities for professional development to strengthen their capacity in implementing differentiated approaches. Teachers should also collaborate in developing contextually relevant and engaging reading materials that cater to varying student needs.

The school ICT coordinator is encouraged to provide technical support and ensure that digital tools and platforms are accessible and effectively used to complement ADM strategies. Coordinators should also assist in training teachers on the use of ICT in delivering differentiated instruction. The school administrator plays a crucial role in sustaining this initiative by allocating resources, supporting training programs, and promoting a school-wide culture of innovation and inclusivity in teaching practices. Administrators should also monitor the implementation of ADM and ICT integration to ensure alignment with educational goals. Lastly, for future researchers, it is recommended to conduct further studies that explore the long-term impact of ADM across different subject areas and grade levels, as well as investigate the role of specific ICT tools in enhancing differentiated instruction. Such research can deepen understanding and provide more comprehensive evidence for policy and practice.

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