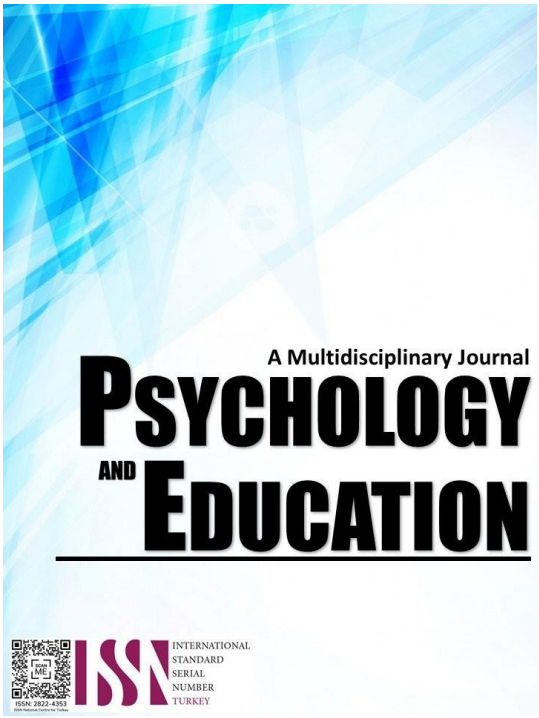
ANDROID ASSISTED READING INTERVENTION TO THE GRADE 4 STUDENTS OF STO. NINO ELEMENTARY SCHOOL



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Research Article

Android Assisted Reading Intervention to the Grade 4 Students of Sto. Nino Elementary School

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Abstract

This study aimed at finding out the Android-based reading needs of the learners; determine the acceptability level of the developed android-based reading material in contents, technicality, and aesthetic qualities; identify the pre-test and post-test scores of the students in the use of the android based reading materials; and test the significant difference in the students' scores, before and after the use of the android-based reading material? This study utilized a design and development research method with quasi-experimental design and used a validated researcher-made questionnaire and assessment to a purposively sampled whole population of 24 Grade IV English subject students. The data was treated with weighted mean to identify the learners 'need and acceptability level of the material, percentage to measure the assessment scores, and paired t-test to test the hypothesis. The findings revealed that the android-based reading needs of the students in both android features and reading comprehension is highly needed and should be centered in independent learning, facilitated contents, vocabulary and combinations, and spiral progression. The acceptability level of the developed android-based reading material in components, technical quality, and aesthetic quality is highly acceptable in all aspects and indicators. The students' pre-test scores increased from did not meet expectations to outstanding in post-test. And, there is a significant difference in the students' scores, before and after the use of the android-based reading material. It is recommended that the developed material be continuously used in reading-based activities and be further improved along the assessment results. The questions and assessments were written in English language as to the medium for instruction. Only one section was utilized in the study equivalent to the whole population of the grade and can be increased in future research and may further be set to controlled and experimental group. This research is one of the district's efforts to generate and contribute to the development of digital and conventional teaching resources. This is a comprehensive study that includes evaluating student needs, providing and implementing treatments, analyzing the results, and improving the content.

Keywords: *ICT, reading comprehension, english, instructional material development, integration*

Introduction

Many students are unable to read with self-assurance, fluency, and comprehension for a variety of reasons that range from lower grade to higher grade levels. These reasons are primarily due to a lack of student materials to be used, as well as a lack of significant impact on student learning interest from the materials that are currently being used. This lack of impact leads to poor engagement, which in turn leads to poor student reading ability (Dean et al., 2021). This weak reading skill has the potential to be considerably enhanced by the use of learning materials that are tailored to the context of interest of the learners, such as the usage of android devices (Sari et al., 2019). Students are primarily responsible for and able to control their learning process, including setting the goal and evaluating the result in active learning, when using digital reading materials in android devices, which provides an innovative and interesting application to be read in the new and better use context.

The K-12 Basic Education Curriculum was developed by the Department of Education with the goal of producing graduates who are communicatively competent and multiliterate. This was accomplished by placing an emphasis on language as the primary instrument of thought and the foundation upon which all communication is built. Reading is an important aspect of language, and it plays an important role in the intellectual, social, and emotional development of people. Reading also plays an important role in the development of key learning areas (K to 12 English Curriculum Guide 2013). It just so happens that the majority of the curriculum is presented in English rather than in Filipino. This is because the law mandates that communication and teaching be given in accordance with Article 14, Section 7 of the Constitution of the Philippines from 1986. However, the performance of schools in other nations like the United States in the English language in terms of reading comprehension falls even below the fundamental level for students in the fourth and eighth grades. This is the case in both countries. According to Paris (2019), the Philippines has a ranking in the low 70s in the 2018 Programme for International Student Evaluation (PISA), which is a student assessment of 15-year-old learners across 79 nations that is carried out by the Organization for Economic Co-operation and Development (OECD). Reading comprehension was the Philippines' weakest point, as its students scored an average of 340 compared to the OECD average of 487.

The findings of this year's PISA, which were made public on December 3rd, centered on reading as the primary measure of academic achievement. The Program for International Student Assessment (PISA) defines reading literacy as "the ability to understand, use, evaluate, reflect on, and engage with texts in order to attain one's objectives, to develop one's knowledge and potential, and to participate in society." In light of the fact that the PISA results also reflect the learners' performance in the National Achievement Test, the Department of Education (DepEd) is aware of the pressing need to address the problems and deficiencies that prevent the Philippines from achieving a high level of quality in its basic education system. Additionally, the Department of Education (DepEd) made the following statement: "We foresee that no Filipino learner should be left behind, and we believe that it takes a country to educate a kid."

Because of this, the Department of Education has issued an appeal to the entire country to actively participate, cooperate, and collaborate in order to improve the quality of basic education in the Philippines. Some pupils at Sto. Nio Elementary School have a difficult time reading and comprehending a variety of reading materials written in English, as has been noticed by the school's teaching staff in the local contexts. Additionally, these pupils are the same students that consistently do poorly in learning exams across a wide variety of courses, which leads to a decline in both the subject's and the school's MPS. However, the school's MPS for the first and second quarters were 59.28 and 61.33 respectively, with the lowest scores being achieved in disciplines where English is used as the medium of instruction. Assessments conducted by Phil-Iri also revealed that some of the kids are still in the learning-to-read stage and are in need of help since they are in the development stage.

Literacy and its component skills, such as the ability to read with fluency and comprehension and the ability to write fluently and coherently, are foundational to educational attainment across domains. These skills bridge the gap between learning to read and reading to learn, and they provide the key that opens the door to a world of textually-based knowledge. The research that Schneider et al. (2015) conducted found that literacy and its component skills are foundational to educational attainment across domains. Even among kids who struggle with reading on its own, there is abundant evidence to suggest that providing pupils with a structured education in the sound-symbol correspondences of spoken and written language can increase literacy ability. The same research found that the adoption of ICT-based integration led to considerable increases in the reading abilities and vocabulary of primary school students. In a similar vein, reading intervention research demonstrates that improving reading abilities may be accomplished by focusing on phonological awareness, phonics, fluency, vocabulary, and reading comprehension in an overt, rigorous, and methodical manner (Galuschka et al. 2014). Reading interventions that make use of information and communication technology (ICT) can be beneficial to children who have trouble reading, particularly those who live in resource-constrained environments and would not necessarily have access to support in the absence of such interventions, as Dean, Pascoe, and Roux (2021) discovered in their study. In addition, the majority of published research (93.88 percent, or 46 studies) found that ICT reading interventions had a favorable impact on the reading abilities of learners. GraphoGame, ABRACADABRA, Reading RACES, and Chassymo are examples of programs that have been subjected to extensive research and have been shown to be effective. Only five research, which accounts for 10.2 percent of the total, were carried out in the majority world; nonetheless, all of the reports in this group revealed good literacy increases with the use of ABRACADABRA and GraphoGame. Considering this, in the Philippine context, a locally developed or adapted program should be prioritized. This must also incorporate Philippine languages and cultural contexts. Existing successful programs like GraphoGame and ABRACADABRA can be translated and customized for Filipino learners. Emphasis should be placed on foundational literacy skills such as phonics, fluency, and comprehension, while integrating ICT-based solutions to reach resource-constrained areas. Also, teacher training on implementing these technologies and a focus on pilot studies in underserved regions will ensure the scalability and effectiveness of the interventions.

Additionally, when examined more closely, each student's Android smartphone has the capability to run reading programs that may be downloaded from the Google Playstore. These include, but are not limited to, "Epic: Kids' Books & Reading," "Reading Comprehension Prep," "Reading Tutor for Kids," and many others. This demonstrates a variety of different experiments into reading intervention using android phones. However, applications were developed in other countries and for students in a variety of contexts, which means that using them in the local settings might potentially alter the outcomes of other types of learning for an increased proficiency.

Research Questions

With these predominant reviewed problems and status. this study seeks to develop and test the effectiveness of reading interventions for Grade 3 using android cellular phones.

1. What are the Android-based reading needs of the learners?
2. What is the acceptability level of the developed android-based reading material in terms of its:
    2.1. contents;
    2.2. technicality; and
    2.3. aesthetic qualities?
3. What is the students' scores before and after the use of the android-based reading material?
4. Is there a significant difference in the students' scores, before and after the use of the android-based reading material?

Literature Review

Android-based Reading Needs

Conceptual understanding, automatic fundamental abilities, and tactics are the three components of good reading comprehension. Topic knowledge, text schemata, and vocabulary are all part of conceptual understanding. Word decoding and the capacity to generate propositions from strings of words are examples of automated fundamental skills. One strategy is to modify one's reading ways based on one's aim and to keep track of one's understanding. However, even if readers possess the same conceptual knowledge and automatic fundamental skills, they may have varied ability to comprehend the same material.

According to Tanczikne (2017), there are a lot of factors that determine how simple or difficult it is for children to learn to read in linguistically distant languages. There are several components to reading abilities. Phonemic awareness, phonics, fluency, and

vocabulary are among the components, according to the researchers. The understanding that words are made up of a collection of separate sounds is known as phonemic awareness. It also entails the capacity to hang on to those sounds, combine them into words successfully, and then separate them again. Only as it applies to the written word, phonics is the link between a given letter and its sound. The orthography of the language also has an impact on reading development. The orthographic depth hypothesis may be used to educate both first and second language readers how to read. It underlines the significance of links between language orthographies and the reading process. imply that words with shallow orthographies are easier to recognize. Deep orthographies urge readers to consider the morphology of written words when processing them. New readers find it challenging to decipher words in languages with somewhat profound orthographies. As a result, youngsters take longer to learn to read. The degree to which a written language is derived from grapheme-phoneme correspondence is referred to as orthographic depth. It all depends on how simple or difficult it is to determine a word's pronunciation from its spelling. The link is less straightforward in deep orthographies, and the reader must acquire the arbitrary or uncommon pronunciations of irregular words.

Similarly, word knowledge and vocabulary are essential variables in facilitating understanding. Perfetti (N.D.) developed the lexical quality hypothesis, which suggests that knowledge of words, including orthography, phonology, morphology, and meaning, supports reading skills. Tanczikne (2017) cited Perfetti (N.D.) who developed the lexical quality hypothesis, which suggests that reading skills are supported by knowledge of words, including orthography, phonology, morphology, and meaning. Understanding sentences requires the ability to recognize words. The process of converting visual information into linguistic presentation begins with the recognition of individual words in the text. To grasp the book, the reader must integrate the meanings of each sentence and analyze the information in the text. To complete this examination, the reader must draw on his or her existing knowledge. This amount of understanding is indicative of the scenario. The reader choose the proper interpretation for the scenario. Several studies have been published to demonstrate the link between various elements and reading comprehension. Finally, Yang (2016) mentioned linguistic factors that contribute to reading comprehension and should be tailored to the pupils. Graphic features, letters, words, phrases, sentences, local coherence, paragraph structure, discourse subject, inferencing, global knowledge, linguistic aspects, and graphic features are all examples of these. These must be used in conjunction with general reading language tactics as well as regional linguistic strategies.

Margareta et al., (2017) stated that information and communication technology (ICT) has become a source of teaching and learning, particularly in the area of reading. As Melor et al (2013) has found both advantages and cons of using ICT in teaching ESL reading and writing, there are several benefits of utilizing ICT for reading. According to the findings of the study, the most important advantages of utilizing ICT in teaching ESL reading and writing include drawing students' attention, easing students' learning process, assisting students in improving their vocabulary knowledge, and fostering meaningful learning. Another research on the use of ICT in the reading classroom. According to Alberth (2013), the use of ICT can solve practically all of the problems associated with teaching and learning English, such as a lack of exposure to the language, a lack of exercises, and a lack of learning resources. However, even if it has been shown to be effective in teaching and learning English, it is necessary to do a need analysis in order to respond to this changing circumstance. Reading behavior on Smartphones or Android, on the other hand, differs dramatically from reading on a desktop computer or laptop. When compared to reading on a desktop computer or laptop, the rise in smartphone reading addiction has produced a new set of obstacles and behaviors, such as exploring more, screening, and selecting reading material judiciously.

According to the findings, using an app on a smartphone significantly increases pupils' capacity to comprehend and analyze reading content. Students that interact with their cellular phone application have a better understanding of text reading. It may be stated that synchronous phone conversation can be a factor in improving reading comprehension (Sari et al., 2019). Today, presentation is significant to students' preferences in android or digital materials, where a percentage, if not the majority, of school learners choose digital reading, which is well supported by technology that may scaffold their learning (Dobler, 2015). Manipulation of font size, text-to-speech choices, and note capabilities, as well as a digital dictionary with graphics and sound that is more effective than a paper-based dictionary, and game-based activities and objectives, are all aspects that stimulate digital reading (Boyinbode, 2018). Kids, on the other hand, need aid from individuals who are competent of sorting resources so that they are not only interesting to students, but also relevant to the school's curriculum, students' competency levels, and the learning framework (Tomlinson & Masuhara, 2017).

Acceptability of the ICT-based Reading Material

Tomlinson (2011) presents several materials development ideas based on Second Language Acquisition theories and concepts: (1) materials should make an impact through novelty, variety, appealing presentation, appealing content, and a manageable challenge; (2) materials should make learners feel at ease by providing plenty of white space and texts that are relevant to their world; (3) materials should help learners develop confidence by providing exercises that are slightly beyond their current proficiency; (4) materials should facilitate learners' self-investment by engaging them in learner-centered discovery activities.

The criteria for good reading materials are formulated based on the principles of material development proposed by Dit. PSMA (2010) and Tomlinson (2011), namely, the reading materials should (1) be relevant and adequate to achieve the competencies; (2) achieve impact through novelty, variety, attractive presentation, appealing content, and achievable challenge; (3) help learners feel at ease; (4) help learners develop confidence; and (5) facilitate learners' self-investment.

Similarly, Bunch et al., (2012) stated that study literatures have shown that in educational materials generated, content and features are the most important components since it emphasizes meaning formation and involvement. Objectives, on the other hand, must be defined

in terms that are clear, explicit, quantifiable, achievable, relevant, and time constrained. The language used must be carefully chosen, and the review process must be progressive. They also mentioned the need of making the content as simple to use as possible for students, as well as adhering to the mandated sizes and placements (formatting) of text, photos, sounds, videos, and general layout. Everything must be well-knit and contribute to a better knowledge and appreciation of the other elements.

Student' Reading performance Using ICT Android Cellphones

The importance of mobile applications in addressing their diverse demands in one hand has largely influenced the rise in smartphone usage. Students were immediately prompted to not only watch, hear, and touch but also read on screen as a result of their exposure to multiple media, bridging the reading activities in the classroom. According to Maulida et al., (2021), reading text is not equally provided in books, vocabulary are decontextualized, and students face many learning restrictions, all of which contribute to poor reading performance.

In addition, according to Moran (2016), in a study conducted using computers and cellphones, students comprehend more contents and articles when the text is presented or read in the phones, with higher comprehension assessment scores, but lower when the text is too complicated and loaded, as compared to when the articles are read on paper or on the computer. As a result, mobile devices and their features can considerably boost students' understanding. Similarly, Gheytasi et al., (2015) found that when smartphones or Android phones were used to deliver reading texts, students scored higher than when traditional reading materials were employed, with significant differences in pre-test and post-test scores.

Several studies encouraged the development of android-based smartphone learning application in teaching reading comprehension which are really feasible to use in the international context (Sari et al., 2019). Similarly, in the Philippines, Llema and Vilela-Malabanan (2019) created an application for translations from English to Tausug (local dialect in Bongao) that help students in reading and comprehension with their Mobile Learning application for English Reading and Writing Skills. Also, Siosan et al. develop and tested the effectiveness of android interactive word game in mother tongue for early childhood learners supporting that android cellphones do help students develop reading and comprehension and is interactive. Similarly, Francia (2022) found that mobile phone facilitated active reading and active writing experiences that develops English language competencies of the students.

Methodology

Research Design

This research employed the design and development research with quasi-experimental design. According to Ulrich & Eppinger (2011) this research design was the set of activities which starts with conceiving an opportunity and concludes in utilizing a material and a scientific process and environment. Additionally, survey questionnaire was also employed in the data gathering process with a researcher-made assessment tools that were validated by selected two (2) master teachers and one (1) elementary school head. These are pilot tested in another year level and found to have a Cronbach Alpha result of 0.83 (good). The study was conducted in Sto. Nino Elementary School with a total of 24 research participants' population who signed a waiver in the conduct of the study and was completely oriented. The whole population was purposively selected since the majority of the class have very low reading comprehension level after assessments and teachers 'observation, and have diverse demographics as to age, sex, social status, and grade performance but are not part of the current study though indirectly contributing to the results. Moreover, all the information were deemed highly confidential and protected.

In analyzing the gathered data, the researcher used the Microsoft Excel and Statistical Packages for Social Studies (SPSS) in computation. The data were treated with weighted mean to identify the learners 'needs in reading and to determine the acceptability level of the material as to contents, technicality, and aesthetics; and percentage to measure the assessment scores in pre-test and post-test; and paired t-test to test the hypothesis of the study.

Meanwhile, the researcher adapted the rating scale for the acceptability level of the, developed material from the work of Villenes et.al (2016). The instruments used a 4-point Likert Scale (4-Strongly Needed/ Highly Acceptable; 3-Need /Acceptable, 2-Not Needed/ Unacceptable, and 1-Strongly Not Needed/Highly Unacceptable) along a range of 3.51-4.00 – SA; 2.51-3.50 – A; 1.51-2.50 – D; and 1.00-1.50 – SD respectively. Other statistical treatments were percentage scores for the assessments, and T-test. Student's assessment scores were described as follows: 90-100 (Outstanding), 85-89 (Very Satisfactory), 80-84 (Satisfactory), 75-79 (Fairly Satisfactory), and Below 75 (Did Not Meet Expectations).

Results and Discussion

Android-based Reading Needs of the Learners

Table 1 presents the frequency distribution of the android-based reading needs of the learners and showed that in android features, the total WAM if 3.85, verbally described as strongly needed with the highest WAM in the indicator 1.4, "facilitating in independent learning", and all the other indicators were described as strongly needed. Similar findings are seen in reading features with a WAM of 3.92, strongly needed and the indicator with the highest WAM are 1.8, 1.9, 1.12, and 1.13 which states "easily understood content, includes vocabulary, help me combine words, and spiral in progression", all with 4.0, strongly needed. The findings show that learners

have a strong preference for Android-based reading materials, particularly those that are attractive, easy to use, and facilitate independent learning. Features such as interactive assessments, rich visual and sound elements, and engaging formats are consistently valued by the students. Additionally, they prioritize reading features that are easy to understand, include vocabulary, relate to prior knowledge, and support language needs. These preferences indicate a demand for reading tools that not only engage learners but also enhance their comprehension and retention through interactive and supportive content.

Table 1. *Frequency Distribution of the Android-based Reading Needs of the Learners*

Statements	*Frequency*					
As a student in reading and comprehension, I prefer an android-based reading material to be…	*4 SN*	*3 N*	*2 NN*	*1 SNN*	*WAM*	*Verbal Description*
Android Features.						
1.1. attractive in all aspects.	18	5	1	0	3.92	Strongly Needed
1.2. getting my attention easily.	13	9	2	0	3.83	Strongly Needed
1.3. easy for my individual learning.	15	7	2	0	3.83	Strongly Needed
1.4. facilitating in independent learning.	14	5	4	1	3.54	Strongly Needed
1.5. composed of assessments in interactive way.	19	4	1	0	3.92	Strongly Needed
1.6. rich in sounds.	21	3	0	0	4.00	Strongly Needed
1.7. rich in visual elements.	20	3	1	0	3.92	Strongly Needed
Total.					3.85	Strongly Needed
Reading Features	4	3	2	1	WAM	
1.8. easily understood content	23	1	0	0	4.00	Strongly Needed
1.9. Includes vocabulary	22	2	0	0	4.00	Strongly Needed
1.10. relates to my former knowledge	21	1	2	0	3.83	Strongly Needed
1.11. having simplified activities.	15	6	3	0	3.75	Strongly Needed
1.12. help me combine words	20	4	0	0	4.00	Strongly Needed
1.13. spiral in progression.	23	1	0	0	4.00	Strongly Needed
1.14. supportive of my language needs.	21	1	2	0	3.83	Strongly Needed
1.15. can be used inside and outside the classroom.	21	2	1	0	3.92	Strongly Needed
				Total:	3.92	Strongly Needed

These implied that educational platforms designed for Android-based devices should focus on creating visually appealing, interactive, and sound-rich content to meet learners' needs. This preference for engaging, independent learning tools implies that developers and educators should emphasize multi-modal instructional materials that cater to different learning styles. Furthermore, with high ratings for features like vocabulary integration and spiral progression, curriculum designers should ensure that content is scaffolded and supportive of language development, making it suitable for use both inside and outside the classroom.

This is supported in the study of Tanczikne (2017), which states that an ICT based material in reading should be individualized, spiral, interactive, and carries features that motivates (Melor et al (2013) the students. These must have the language aspects such as pictures, sounds, letters, sentences, cohesion and other features even with the use of cellphone (Sari et al., 2019).

Acceptability Level of the Developed Android-based Reading Material

Table 2. *Weighted Mean, Verbal Description and Rank of the Acceptability in terms of Content, Technical, and Aesthetic Quality of the Developed material*

Content Quality			
Components	*WM*	*Verbal Description*	*R*
1. Objectives	3.87	HA	2
2. Content and Features	3.85	HA	3
3. Language Used	393	HA	1
4. Learning Evaluation	3.55	HA	4
Technical Quality			
Components	WM	VI	R
1. Technical Standards	3.78	HA	2
2. Facilitation and Usability	3.89	HA	1
Aesthetic Quality			
Components	WM	VI	R
1. Layout and Design	3.83	HA	1
2. Visuals and Texts	3.80	HA	2
Total	3.74	HA	---

Table 2 presents that weighted mean, verbal description, and rank of the acceptability in terms of content, technical, and aesthetic quality of the developed material and show that the material in terms of components, technical quality, and aesthetic quality all have a verbal description of Highly Accepted with a total WAM of 3.74, Highly Accepted. The analysis of the developed material indicates a high level of acceptability in terms of content, technical, and aesthetic quality. Key components such as the language used, objectives,

and content features received favorable feedback, highlighting that the material aligns well with learners' needs and expectations. In terms of technical quality, usability and adherence to technical standards were well-regarded, showing that the material is both functional and accessible. Aesthetically, the layout and design, along with visuals and texts, were also appreciated which further enhances the overall user experience.

These findings suggest that the developed material is well-rounded and meets learners' expectations across content, technical, and aesthetic aspects. The strong acceptability of the language, usability, and visual appeal implies that educational materials should focus on clear communication, ease of use, and engaging design. For future developments, maintaining this balance between content quality and user experience is crucial in creating effective learning tools that are both functional and appealing to students.

According to Tomlinson (2011), the material which is the android-based reading material in this study need to have an impact in novel features that appeals to the students, simplified the learning, build confidence, and offer motivating authentic experiences and relevant. Also, as Bunch et al. (2012), mentioned, that an acceptable material must be content-wise and feature-wise for meaning making and student participation.

Student's Pre-test and Post-test Scores

Table 3. *Pre-test and Post-test Scores of the Students in Reading Comprehension*

Student Number	*Reading Comprehension (10 Items)*					
	Pre-Test			*Post-Test*		
	Raw Score	*Percentage Score*	*Verbal Interpretation*	*Raw Score*	*Percentage Score*	*Verbal Interpretation*
1	4	70	Did Not Meet Expectations	9	95	Outstanding
2	3	65	Did Not Meet Expectations	8	90	Outstanding
3	4	70	Did Not Meet Expectations	6	80	Satisfactory
4	4	70	Did Not Meet Expectations	7	85	Very Satisfactory
5	5	75	Fairly Satisfactory	7	85	Outstanding
6	4	70	Did Not Meet Expectations	6	80	Satisfactory
7	1	55	Did Not Meet Expectations	8	90	Outstanding
8	4	70	Did Not Meet Expectations	6	80	Satisfactory
9	3	65	Did Not Meet Expectations	7	85	Very Satisfactory
10	5	75	Did Not Meet Expectations	8	90	Outstanding
11	5	75	Fairly Satisfactory	9	95	Outstanding
12	4	70	Did Not Meet Expectations	8	90	Outstanding
13	3	65	Did Not Meet Expectations	6	80	Satisfactory
14	4	70	Did Not Meet Expectations	8	90	Outstanding
15	4	70	Did Not Meet Expectations	7	85	Very Satisfactory
16	6	80	Satisfactory	10	100	Outstanding
17	3	65	Did Not Meet Expectations	9	95	Outstanding
18	4	70	Did Not Meet Expectations	9	95	Outstanding
19	4	70	Did Not Meet Expectations	8	90	Outstanding
20	6	80	Satisfactory	10	100	Outstanding
21	2	60	Did Not Meet Expectations	9	95	Outstanding
22	3	65	Did Not Meet Expectations	9	95	Outstanding
23	3	65	Did Not Meet Expectations	10	100	Outstanding
24	5	75	Fairly Satisfactory	9	95	Outstanding
Mean	3.875	75	Did Not Meet Expectations	8.041	90	Outstanding

Table 3 presents pre-test and post-test scores of the students in reading comprehension where it shows that in pre-test, the students have a total raw score of 3.875 or 75% interpreted verbally as Did Not Meet Expectations; while in the post-test, the total raw score is 8.041 or 90% verbally interpreted as Outstanding. The students' performance in reading comprehension increases from the students' satisfactory, fairly satisfactory, and did not meet expectations performance to satisfactory, very satisfactory, and outstanding performance. Generally, an increase from did not meet expectations to outstanding is explicit. The results show a significant improvement in students' reading comprehension performance from the pre-test to the post-test. Initially, students were performing below expectations, but after the intervention, their scores increased, with many achieving outstanding results. This improvement indicates that the reading program or intervention had a positive impact on the students' comprehension skills, moving them from unsatisfactory performance levels to satisfactory and above.

The findings suggest that the implemented reading program is effective in enhancing students' reading comprehension. The noticeable shift from underperformance to excellence highlights the program's potential for improving literacy outcomes. This implies that similar interventions could be beneficial in other educational contexts, particularly for students struggling with reading comprehension. It also supports the continued use and development of such targeted reading programs to foster higher academic achievement in this area.

In reference to Maulida et al. (2021), it was mentioned that adroid-based material addressed the needs of the current generation of

students that increase their interest, engagement, and performance because of its varied and new means of presenting the contents and the procedures of assessments. This increase the comprehension since it is used in the phone (Moran, 2016).

Significant Difference in the Pre-test and Post-test Scores in Android-based Reading Material

Table 4. *Paired Sample T-Test Showing the Significant Difference between the Pre-Test and Post-Test of the Grade 4 Students in reading comprehension*

Test		*Mean*	*Standard Dev*	*df*	*t-value*	*p-value*	*Interpretation*	*Decision*
Reading Comprehension	Pre-test	3.875	1.153	23	-11.735	.00001	Significant	Reject Ho
	Post-test	8.041	1.301					

Table 4 presents the paired sample t-Test showing the significant difference between the pre-test and post-test of the grade 4 students in reading comprehension and showed that with the p-value of .00001 lower than the significance level of .05, the null hypothesis is rejected. There is a significant difference in the pre-test and post-test results. Since the t-value of 11.735 is greater than 1.714 critical value, then the null hypothesis is rejected. From this, there is a significant difference in the students' scores, before and after the use of the android-based reading material. The paired sample t-test results indicate a significant difference between the pre-test and post-test scores of Grade 4 students in reading comprehension. The post-test scores show a marked improvement compared to the pre-test, with the statistical analysis confirming that the observed difference is significant. This suggests that the reading intervention or instructional method applied between the two tests had a meaningful and positive impact on the students' comprehension abilities.

The significant improvement in post-test scores implies that the intervention used was highly effective in enhancing students' reading comprehension skills. This result supports the adoption of similar instructional methods or reading programs in broader educational settings. It also emphasizes the importance of specifically developed interventions to address literacy challenges and improve academic outcomes in reading comprehension, particularly for younger learners.

This is supported in the study of Gheytasi et al (2015), stating that the use of smartphone in the reading comprehension class or activity significantly create a student high performance as compared to their prior reading status. Likewise, as Moran (2016), mentioned, comprehension in reading needs to be studies and improved, and teachers need to use computer and cellphones to help learners learn with interest and facilitated experience according to their learning preferences.

This study covered identifying the reading needs of the students when using android phones, the acceptability level of the developed reading material in terms of its contents, utilization, and aesthetic qualities, and the pre-test and post-test scores with test of significant difference. This study would include the utilization of the materials, from development, to evaluation and enhancement.

Likewise, it was limited only in/for the grade 4 students of Sto. Nino Elementary School. The data was collected through descriptive survey questionnaire to the whole population of 24 Grade 4 students in the brgy. school. The study covered the months of November, 2021 to April 2022, with only one lesson in reading comprehension and vocabulary development.

Conclusions

The study concluded that the android-based reading materials are highly beneficial to students, particularly in addressing their needs for independent learning, facilitated content, vocabulary development, and spiral progression. The features incorporated in the app effectively support reading comprehension. Additionally, the developed material was deemed highly acceptable across all components, including technical and aesthetic quality. A significant improvement was observed in the students' performance, with pre-test scores rising from not meeting expectations to outstanding in the post-test. Moreover, a notable difference was found between students' scores before and after using the reading material, confirming its effectiveness.

The following recommendations are proposed from the study. The material should be further developed and enhanced to address the evolving needs of learners, ensuring its relevance and effectiveness. Additional testing of the material's acceptability and effectiveness among a broader group of students is advised, with continuous efforts to improve its technical and aesthetic quality. Increasing the number of reading items and introducing varying difficulty levels would help cater to a wider range of learners, enhancing the material's effectiveness. Lastly, the consistent use of the android-based reading comprehension material, along with well-aligned objectives and assessments, is encouraged to maximize its long-term impact on students' learning outcomes.

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