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CLICK: INTERACTIVE APP FOR READING COMPREHENSION

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Abstract
For the past decades, technology has been used as a revolutionary aid for education. With recent innovations, it served as a new platform for learning. Since the stirring of the COVID-19 pandemic and the series of global lockdowns, an increase in mobile use has been observed. It solidifies technological innovations grounding as a mode of learning. This study was conducted using the close-group tutorial employing the Accomplish Reading Application as an intervention for remediation among slow learners of primary-grade English. It employed the experimental design where it compared the pre- and post-intervention test results. Indeed, the use of a mobile interactive application is an effective strategy to enhance the comprehension skills of the pupils as observed in their improved and increased test scores.

Keywords: interactive reading app, reading comprehension, reading remediation, slow readers

Introduction
Technology had been foreseen as a promise towards a better future and a better society (US Department of Education, 2017; OECD, 1998). It has proven its use as it was at the forefront of human advancement considering that this civilization's modern accomplishments are technological– even permeating education (Johnson & Wetmore, 2021), and ushering in a new age in education that sparked a revolution (Collins & Halverson, 2010).

Focusing on education, technology revolutionized and opened up further possibilities for better education (Raja & Nagasubramani, 2018). With the understanding of the technology and education's relationship, teaching professionals acknowledge technology in curricular development (Falloon, 2020; Sabzian *et al.*, 2013; Black, 1998). With this, The Department of Education (DepEd) pursued the integration of technology into the Philippine education system (DepEd Order 23, s.2004). Studies have shown that technological integration (through computer-aided education) has significantly improved the effectiveness and quality of education (Ghavifekr & Rosdy, 2015; Cingi, 2013).

Mobile technology and the internet expanded the potential of technology, resulting in digital learning/e-learning, which made education more accessible and understandable (Al Rawashdeh *et al.*, 2021; Magdalene & Sridharan, 2018). There are few studies regarding the use of mobile apps for reading comprehension (Maulida *et al.*, 2021; Klimova & Zamborova, 2020; Agustini *et al.*, 2018), but there are currently no studies on the use of apps for reading comprehension in the context of slow English readers among the basic primary graders. This study would like to test the assumptions that technology-based education could be significant for students' learning. As a further inquiry, could these mobile apps be effective in comprehension development?

Thus, this study tested technology (in the form of a mobile app) as an advantage in the learning process - producing a desirable outcome for the teaching-learning environment. Specifically, the researchers conducted a close-group tutorial focusing on the use of IA as a platform for the reading comprehension development of Grade 6 remedial pupils of Brgy. Makalangot, Arakan, Cotabato.

Statement of the Problem

This research explored the use of an Interactive App (IA) as a teaching tool in improving the reading comprehension of pupils under remediation. Specifically, this study addressed the following: 1) identify the level of the pupils' reading comprehension before the use of IA in the tutorial program; 2) describe the level of the pupils' reading comprehension after the use of IA in the tutorial program; and 3) compare the pupils' performance before and after the use of IA in the tutorial program.

Theoretical Framework

This study is anchored on Operant Conditioning (also known as instrumental conditioning) by Skinner (1935) which proposes a method of learning employing rewards and punishments for behaviour. Operant Conditioning associates a behaviour and a consequence (whether negative or positive). In this study, we are associating 'gamification' and its immediate feedback as a positive condition for learning. Gamification introduced the concept of developing software into a game for a specific purpose, especially in non-entertainment contexts. Gamification has been applied to many industries, but we will focus on the gamification of learning content for education. Studies about gamification have been varied but studies see a positive effect on the use of gamification in education depending on the context (Seaborn & Fels, 2015). Thus, hypothesizing that using IAs will promote learning, furthermore, on reading comprehension. This study is also based on the Two Factor theory of Motivation by Herzberg, Mausner, and Snydermann (1959) which proposes two factors affecting motivation: motivator factors and hygiene factors (Alshmemri *et al.*, 2017). Motivator factors are those that lead to satisfaction and motivate people in attaining a goal while hygiene factors are factors that lead to dissatisfaction when absent. In this study, we will treat IA as a motivator factor that would increase the likeliness of learning. Thus, IA will act as a positive condition for the learners as something that they can manipulate and be familiar with (as a technology-based learning platform). It

will also act as a motivating factor that would increase their likelihood to learn using educational apps - just the way they would use their gadgets for entertainment.

Research Paradigm

This study is conceptualizing that IA is the independent variable that affects the dependent variable: the pupils' reading comprehension. The figure below shows the schematic presentations of the variable that will be highlighted in the study. The variables include the IA and pupils' comprehension levels as measured by reading tests.

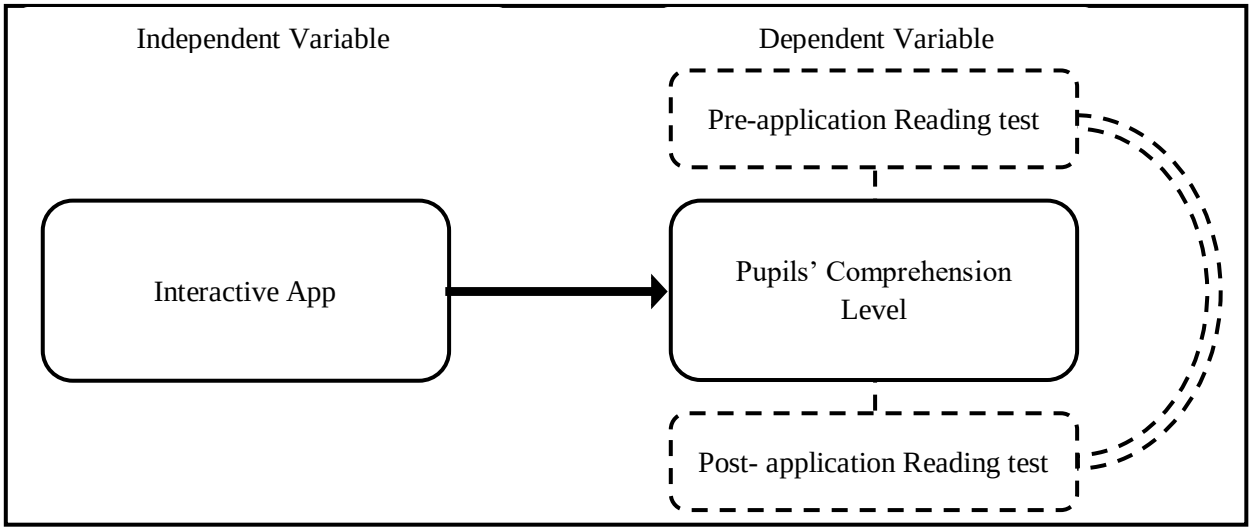

Figure 1. The schematic presentation of the study, "Click: Interactive app for reading comprehension".

Ethical Consideration

The researchers processed the collected data with strict secrecy to protect the respondents' and informants' personal information and identifying traits. They also made certain that the data were not manipulated, which might bias the findings, and that the respondents participated willingly rather than being forced or pressured. Following the five key ethical principles of ethical research: a) informed and voluntary consent; b) confidentiality of information shared; c) anonymity of research participants; d) beneficence or no harm to participants; and e) reciprocity (Halai, 2006), respondents had the freedom to participate (or not participate) or withdraw from the study (at any time) without penalty for whatever reason: discomfort, personal reasons, etc. Most importantly, they established a trustworthy connection with the participants to ensure that their replies were not shared with others (Hammersley & Traianou, 2012). Following criteria and avoiding plagiarism, guidelines given out by authorities before beginning research are critical, and if data is shown to be incorrect, it is my obligation to fix it (Miller *et al*., 2012). The researchers also properly cited several writers who were quoted in support of this study. Following the completion of this

survey, the researchers presented some mementoes to the respondents to express heartfelt gratitude for their participation and support of this research.

Method

This study operated using a quantitative research design in data gathering and presentation of the study's results. The quantitative research design analyzed the numerical data, which are the test scores of the participating pupils, garnered during the conduct of this study. Specifically, the researchers used a pretest-posttest experimental design in conducting the research – using a mobile app as the intervention of the study. A pre-test and post-test were conducted before and after the intervention was used. The difference between the two data points (pre-test & post-test scores) will be the basis for the analysis and conclusion of this study to measure the effectivity of the app on the participants.

The researchers conducted this study at the Barangay Hall of Makalangot, Arakan, Cotabato, Philippines. The researchers piloted a remedial (tutorial) program held on January 18 to 21, 2022 and February 21 to 24, 2022 at the said location. The respondents of the study were Grade-6 public school pupils undergoing a reading remediation program. Since the Philippine Informal Reading Inventory or Phil-IRI, a diagnostic examination annually conducted by DepEd was not conducted due to the health restrictions of the COVID-19 pandemic the participants were chosen through convenience sampling (from the 30 pupils who are near the area) and pupil self-reporting that they have reading comprehension difficulty. To further filter the participant data, only those who scored 6 points (developing level) and below (during the pre-test) were recorded for data analysis.

This study used a reading comprehension test questionnaire, adopted from Manis (*n.d*) from dailyteachingtools.com, composed of 10 items per conduct and a post-evaluation form. This study used the 'Accomplish Reading' app developed by Offutt (2019) as the IA which can be installed on Android tablets and computers (through Android Emulation). The app has six parts (Part A to Part F). Each part consists of 8 subsets. Parts A and B have 10 passages to read per set. Parts C to E have 5 passages in each set while Part F has 4 passages per set.

This study employed convenience sampling to select the participants, in which geography and the dilemma of the Covid-19 pandemic were considered. Thus, only those who were available to participate in the program and had the following conditions were considered as the participant pool: have undergone a remediation program; have self-reported having reading comprehension difficulty; have basic decoding (reading) skills; and have attained below passing score during the pre-test (having scored below 7 points).

Procedures

During the planning stage, the researchers browsed for useful apps for the study which focuses on the development of reading comprehension, of which at the time of this conduct, apps pertaining to reading comprehension were not many (aside from the

test apps designed as a review app for language testing systems). Dr. Jane Offutt's (2019) *Accomplish Reading App* was selected as the intervention of the study.

The researcher started by determining the levels of the pupils using a pre-test, after which they also prepared the necessary materials like printed reading comprehension test sheets and the gadgets needed for the study. Afterwards, they installed the app on tablets and laptops through android emulation.

With the assistance of their class adviser, the participants were pre-grouped and divided into batches of five (numbers vary from each batch). The researchers implemented a two-day program per batch. On the morning of the first day, the researchers administered the pre-test and let the pupils answer Parts A and Part B of Accomplish Reading App. The researchers let the pupils answer Parts C and Part D in the afternoon. The pupils answered Part E of the app on the second day of the program, while Part F was left optional. This setup was repeated for the succeeding batches of pupils.

Mean was used to show the average test scores of the pupils before and after the intervention. The researchers used T-test to analyze the diagnostic test scores of the pupils before and after the application of IA in the remediation program. The statistical tool tested whether the pre-test scores and post-test scores were significantly different.

Findings and Discussion

Accomplish Reading ® App

This section shows how Accomplish Reading ® App by Offutt (2019) works.

Figure 2. Six parts of Accomplish Reading app

Accomplish Reading ® has six parts, each with a unique challenge:

Part A "Does it Make Sense?" – identifying if a sentence makes sense.

Part B "Do they Have the Same Meaning?" – comparing sentences' similarity.

Part C "Does the title sentence match the meaning of the paragraph?"– comparing the title sentence's relation to the main paragraph.

Part D "The Disappearing Title" – comparing the relation of the title to the paragraph, but the title disappears.

Part E "The Disappearing Paragraph" – compares the relation of the paragraph to the title, but the paragraph disappears.

Part F – "Does the Underlined Sentence Make Sense?" – relating the sentence according to the context in the paragraph.

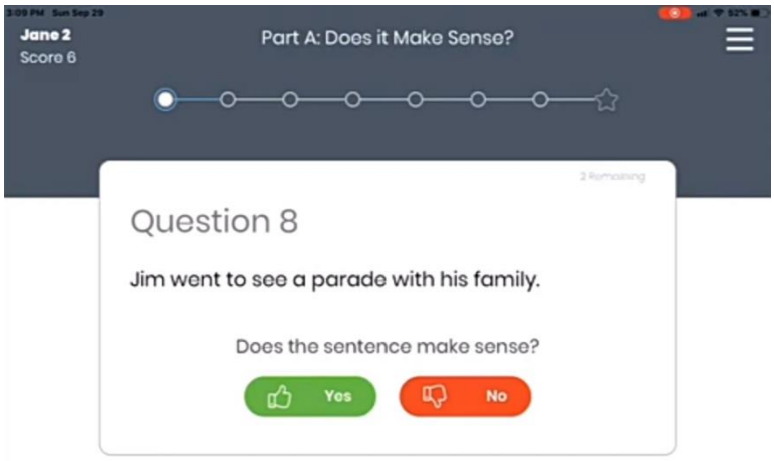

Figure 3. Part A: Question 8

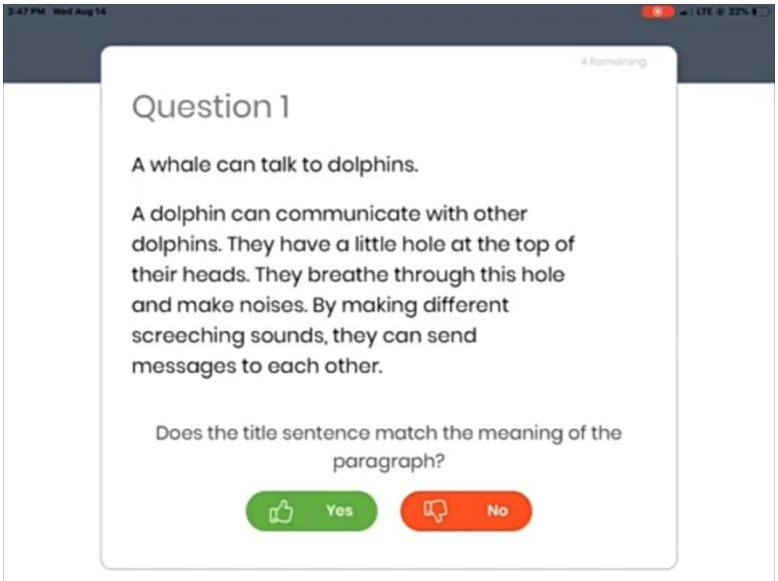

Figure 4. Part A: Question 1

The app presents a situation (a short reading passage) for the student to read, analyze and answer. The student may choose from two options: Yes (agreeing with the situation) or No (disagreeing with the situation).

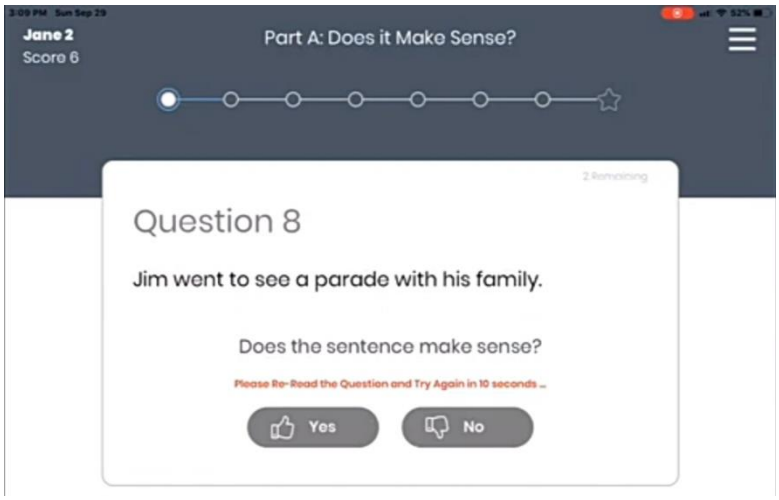

Figure 5. Wrong answer

Choosing the right answer allows the reader to continue. If the reader selects the wrong answer, an error message will prompt the reader to re-read the question for a certain amount of time.

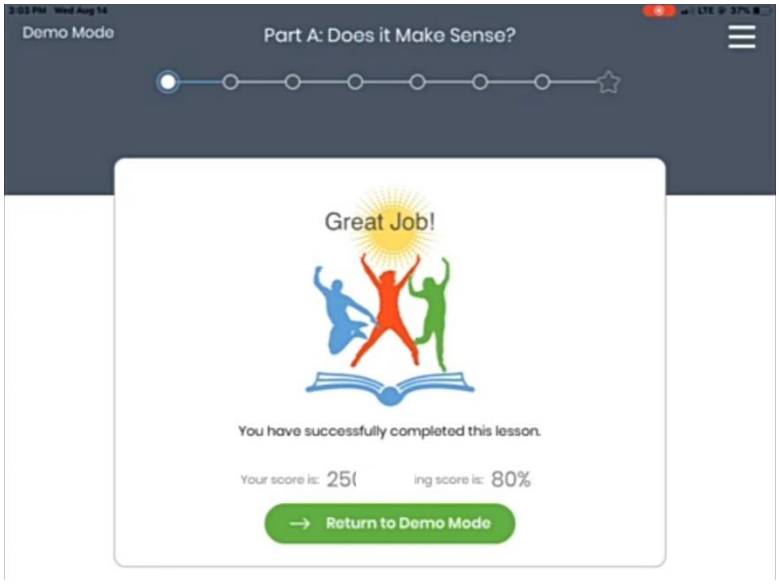

Figure 6. Right answer

Upon completion, the scores will be recorded to specific user data.

Results

Level of pupils' reading comprehension before the use of IA

Table 1 presents the comprehension level of the participants before the intervention was used for them during the tutorial session.

Table 1. Participants' Comprehension Levels before the Intervention

		Mean	**Descriptive Equivalent**
Pre-Test Scores		3.00	Beginner
Legend:	9-10 Highly Proficient	7-8 Proficient	5-6 Developing
	3-4 Beginner	0-2 Poor	

Highly Proficient	Has a good understanding of what he/she is reading
Proficient	Comprehends most of what he/she is reading
Developing	Understands some of what he/she is reading
Beginner	Barely understands what he /she is reading
Poor	Does not understand what he/she is reading

Clearly, the pre-test scores of the participants showed a mean score of 3.00. It has the descriptive equivalent of a "beginner" level. This means that before the intervention was conducted, the participants have a low comprehension level and could barely understand what they are reading. Furthermore, this states their low proficiency in reading and validates the necessity for remediation in terms of reading comprehension. This is to be expected as it is a condition to include the data of the participants who were at a 'developing' comprehension level or lower. This affirms that the participants have a reading comprehension difficulty that may be due to pupils' developmental delay, poor vocabulary, lack of confidence to practice reading in class, poor motivation from teachers and parents to help develop their interest in reading, lack of pre-reader books in school and at home, lack of library, teachers' inadequate knowledge of phonemic awareness strategy of teaching reading, and lack of reading club could all contribute to low reading comprehension (Nanda & Azmy, 2020; Mohammed & Amponsah, 2018; Spencer & Wagner, 2018; Iqbal *et al.*, 2015). With the conduct of a remedial program, it is imperative that both reading fluency and comprehension may improve (Mangila & Adapon, 2020; Almutairi, 2018; Balinas *et al.*, 2017).

Level of pupils' reading comprehension after the use of IA

Table 2 below shows the comprehension level of the participants after the intervention was used for them in the tutorial session using IA.

Table 2. Participants' Comprehension Levels after the Intervention

		Mean	**Descriptive Equivalent**
Post-Test Scores		7.65	Proficient
Legend:	9-10 Highly Proficient	7-8 Proficient	5-6 Developing
	3-4 Beginner	0-2 Poor	

The post-test scores of the participants after the tutorial session using IA are described as "proficient", with a mean score of 7.65. This means that the participants have a higher comprehension level when the post-test was conducted. This implies that the pupils understood what they were reading.

Furthermore, this suggests that there is a positive increase in the pupils' comprehension levels after the intervention was implemented. This post-test mean score level is comparably higher than their pre-intervention test scores. Furthermore, these hint at the positive effect of the intervention, which is the app, on the comprehension levels of the pupils. This result is similar to the studies conducted by several authors (Hicks, 2018; Wanzek *et al.,* 2017; Richards-Tutor *et al.,* 2015) where they agreed that there was an improvement in the reading comprehension of pupils who underwent intervention activities.

Significant difference in the pupils' reading comprehension levels before and after the use of IA

Table 3 shows the correlated difference between the pre-test scores and the post-test scores of the participants.

Table 3. Significance of the difference between pre-test and post-test scores of the participants

Variables	**T value**	**df**	**P-value**	**Significance**
Pre-test – Post-test	-11.11	19	.00	Significant

The table shows the difference between the pre-test and post-test scores of the participants which shows that there is a significant difference between the two variables. The results show that the T value is -11.11, with a different value of 19 and a P-value of .00. This means that there is an improvement after the intervention was implemented and that the use of IA is effective. Indeed, interactive or mobile apps nowadays could be exploited by both teachers and learners for the teaching-learning process. Aside from the fact that mobile apps are a novelty and fun to use, they could help teachers and learners perform their tasks with ease, reliability, and efficiency (Demir & Akpinar, 2018; Etcuban & Pantinople, 2018; Rezaei *et al.,* 2014).

Conclusions

After the analysis of the data, this study found out that the pupils have a beginner comprehension level before the use of the intervention in the tutorial program which indicated that they barely understood what they are reading. In comparison, the pupils attained a proficient comprehension level after the use of the intervention in the tutorial program which indicated that they comprehend most of what they read. This entails that the pupils' post-intervention diagnostic test scores increased compared to their pre-intervention diagnostic test scores. Furthermore, the t-test shows that there was a significant difference between the pre-intervention test scores and post-intervention test scores.

Based on the findings, it is affirmed that IAs have a considerable impact on pupils' reading comprehension indicating that they have improved during the intervention. The use of the app develops reading comprehension and is an effective platform for learning. It can be assumed that the success of the app as an intervention is affected by its design and content. Furthermore, it is possible that independent of the app utilized in this study, well-designed apps could boost the likelihood of the learner to progress in learning.

The study recommends that IAs be used to promote learning and, in this case, develop reading comprehension. As a result, pupils and educators are encouraged to embrace technology to improve the learning environment. Furthermore, educators must be positive about the use of technology under the right conditions.

Administrators and software developers are advised to invest in the platform and further develop the software/apps. Learning could be improved much further with technological advancements. Also, allotting more support for access would be recommended.

Future researchers should conduct similar studies with a larger sample size and over a longer period of time to assess the long-term impacts. It is also advised to investigate the content of the applications and how they will affect the learning process. Qualitative research (i.e. phenomenology) is recommended to further examine the insights on the use of mobile applications as experienced by the participants. A similar study is also recommended for students who do not have access to technology-based education.

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