

# Describing Students' Reading Efficiency in the Use of Printed and Digital Materials

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**Abstract:** *The texts and other resources that teachers use in the classroom to help students develop their literacy skills are referred to as classroom reading materials. These include textbooks, workbooks, picture books, online resources, and other resources that can help students improve their reading performance. In the 2018 PISA results, the Philippines ranked the lowest in terms of reading literacy (DepEd, 2019) and over 80% did not reach a minimum level of proficiency in reading (OECD, 2019). Reading Efficiency is a critical component of reading proficiency (Reading Plus, 2019) and is commonly associated with reading speed and comprehension (Berget & Fagernes, 2021). Students who read efficiently focus more on understanding the actual meaning of the text rather than focusing on the mechanics of reading (Reading Plus, 2019). Many studies have been conducted about reading comprehension and reading materials, however, only a few are about reading efficiency. In the present study, the reading efficiency of students in the use of printed and digital materials was examined. Thirty-four students were examined through a 10-item questionnaire and two sets of tests – one for the Print Material and one for the Digital Material. For the first test (Printed Material) the overall scores of the students were 87.38 and for the second test (Digital Material) the overall score of the students was 92.29 which shows that students got a higher score in reading efficiency in the test for the Digital Material than the Printed Material. However, results showed that there is no significant difference between the reading efficiency of 2nd year BSED major in English using both formats. Thus, educators should consider incorporating both formats in their instructional approaches considering that there's no significant difference in the students reading efficiency in using Print or Digital material.*

**Keywords—** reading; reading efficiency; reading comprehension; reading speed

## 1. INTRODUCTION

Reading Comprehension describes the capacity to comprehend and extrapolate a text's meaning. Reading is a necessary talent for academic achievement and continuing your education, and it is essential in many facets of daily life, including reading instructions, following directions, and analyzing news items. Moreover, several variables affect comprehension, like the reader's motivation, interest, and engagement with the material. Reading comprehension is widely recognized as a crucial skill that underlies success in education and beyond. Comprehending written materials is essential for academic pursuits, navigating everyday life, engaging with complex information, and making informed decisions (Wilson, 2022).

Additionally, students who struggle with reading comprehension may experience challenges in other academic areas, such as writing and math. (Datu & Park, 2019). Readers who struggle with reading comprehension encounter daily difficulties, especially when trying to learn new things and accessing information online (Bruggink et al., 2022). Students with strong reading comprehension abilities consistently outperform their peers in various academic measures, including overall grades, subject-specific achievement, and performance on standardized tests (Johnson, 2020). Moreover, reading comprehension is a vital skill that significantly influences academic success and overall

educational outcomes (Miller & Smith, 2018). In addition, reading comprehension is not only an essential skill for learning in school but also to successfully engage in daily life, like the need to be able to read and understand newspapers, job application forms, job labels, directions, or anything that engages through reading (Chatman, 2015). Also, people need to have reading skills to have a stable job, live independently, and engage in various daily activities (Hoeh, 2015; Mahdavi & Tensfeldt, 2013).

The use of texts and other resources that teachers use in the classroom to help students develop their literacy skills are referred to as classroom reading materials. Examples of these products include textbooks, workbooks, picture books, online resources, and other supplemental materials that help students increase their reading comprehension, fluency, and critical thinking. For classroom learning to be practical and academic success to be supported, selecting and using the right reading resources is essential. The medium or format of classroom reading material comes in two mediums or formats—Print and Digital. These Print reading materials can be in the form of a book, magazine, comic book, or even plain paper with something printed. Digital Classroom reading materials, on the other hand, can come in a Word file, pdf file, or even a PowerPoint presentation, anything that can be read on screen.

Reading materials must engage readers, suit their needs, and inspire them. Subsequently, natural reading

materials might help students learn to use English in context. Reading also contributes to improving students' cultural and communication skills. Concerning the previous statement, it is crucial to direct attention to the assessment of teachers' perceptions of genuine reading materials as they are shown in the expectations of instructors and how they show up in classroom activities (Rusmawaty et al., 2018). It is important to remember that how reading materials are used in the classroom affects their effectiveness. Despite financial difficulties, interventions can be utilized to encourage parents to obtain different reading materials available for their children at home to enhance their reading habits and further develop their reading comprehension (Aquino, 2018). Teachers should also routinely evaluate their students' development and modify their instruction and resources as necessary.

According to Nolen, S.B. (2007). students' willingness to read can be increased, and their reading skills can be improved by providing them with excellent, engrossing, and culturally sensitive reading materials. However, the effectiveness of these materials will depend on how they are used in the classroom. There are many different formats for reading materials for classes, including printed and digital materials. Printed materials are actual copies of books, texts, and other reading resources, whereas digital materials are electronic equivalents that may be accessed on a computer, tablet, or other digital devices. Teachers must consider each reading format's various advantages and disadvantages when selecting reading resources for their students.

For many years, reading materials in the classroom have often been printed materials. According to the study, physical documents offer some benefits over digital ones. Students who read printed materials displayed greater reading comprehension and memory than those who read digital readings (Mangen et al., 2013). Moreover, printed materials offer sensory and visual signals that improve comprehension and retention (Mangen & Velay, 2010). A page's physical arrangement of text and graphics might offer cues to help the reader remember key details or draw connections between disparate ideas. However, print media also has its limitations. For instance, print materials can be significant and heavy, which makes moving them from one place to another difficult, and for schools with tight budgets, the price of printed materials can be excessive.

Over the past few years, digital resources have grown in popularity due to their accessibility and ease. Digital Materials also offer a variety of advantages, such as quick information searching, access to multimedia resources, and the capacity to tailor the curriculum to the needs of specific students (Schugar et al., 2013). Also, digital materials are easy to update, ensuring the information is accurate and current. On the other hand, digital resources do have some restrictions. They need internet and technological access, which not all

pupils may have. Also, due to eye strain or other visual difficulties, some students could find it difficult to read digital texts for extended periods (Liu, 2015).

Providing enough reading materials, like novels, using printed and digital materials with engaging activities can promote students' social simulation. These practices can benefit in understanding more about what they read and enhance their reading comprehension (Taylor, 2017). However, when choosing reading materials for their students, teachers must consider both forms' benefits and drawbacks. Digital materials offer ease, accessibility, and customizing choices, while printed materials offer tactile and spatial signals that help with memory recall and comprehension.

Classroom reading in class is an essential part of literacy instruction and has been associated with academic performance. Reading is essential because, through reading, we acquire information and will also lead us to understand the information in the text (Pradani, 2021). Also, by encouraging empathy, perspective-taking, and social awareness, reading activities in the classroom can enhance children's social and emotional development (Sipe & Curlette, 2016). A few of the benefits of reading include strengthening the brain and improving memory, and improving a Child's Vocabulary and Language Skills (Schlauch, 2014). However, each student learns differently and prefers different things, even when it comes to the format of reading materials. Some people find reading printed text effective for them, and some find digital texts compelling; a study by Foasberg (2014) shows results that student tend to use print for academic and long-form reading, and electronic resources were sometimes used for academic purposes but often used to read shorter and non-academic purposes. A study by Baron (2016) shows that most people prefer to read using printed materials when they read longer texts and read just for pleasure, and they can concentrate more using printed materials. Another study by Kaufman and Flanagan (2016) shows that students reading in digital format answered concrete questions well, while those reading in print did better on abstract questions needing inferential reasoning. Another study supports the notion that students can read in print and digital formats (Sage et al. et al. 2019). However, the researchers have yet to find if one is more effective than the other or are both formats equal regarding how effective it is on students' comprehension and reading performance.

Reading literacy and its connection to the academic setting can be considered one of the critical skills that play a role in academic settings since, in academics, most of the knowledge that we gain is acquired through printed materials such as books, monographs, and written documents (Delgadová, 2015). In connection with this, based on the test called PISA, a Programme for International Student Assessment that tests or measures 15-year-old students' skills in reading, mathematics, and science every three years, conducted by the Organization for Economic Co-operation

and Development (OECD) where 15-year-old students in 79 countries were tested in 2018, among all the 79 participating countries, the Philippines got an average score of 340 in reading literacy which is significantly lower than the OECD average of 487 points. (DepEd, 2019). Over 80% did not reach a minimum level of proficiency in reading, which is one of the low performers among all participating countries and economies (OECD, 2019). In connection with this, Reading Efficiency is a critical component of reading proficiency, and it is crucial, especially to students, because when students experience inefficient reading, they usually avoid reading and may lack the motivation to engage with the text and readers who read inefficiently read more slowly and spend most of their reading time on the mechanics of reading rather than understanding the actual meaning of the text, whereas those who read efficiently learned to compensate for their inefficiencies and are still able to comprehend the text they are reading (Reading Plus, 2019). Reading Efficiency is also commonly associated with reading speed, and as a means of measurement, it is either used alone or combined with other units. However, a measure of reading speed is only sometimes successful reading because comprehension also plays an important part (Berget & Fagernes, 2021).

There are several studies that relates to reading efficiency. For instance, in a study by Spichtig et al. (2017) the comprehension-based silent reading efficiency of students in the U.S. in grades 2, 4, 6, 8, 10, and 12 was measured. Through an eye movement recording system, the reading rate, fixations (eye stops) per word, durations, and regressions per word (right-to-left eye movements) was measured. Results showed that reading rates rose over the years, however, between grades 6 and 8, the development of reading rates seemed to stagnate, and between grades 10 and 12, the reading rates increased among children in the top two quartiles. In terms of the grade 2 students, their reading rate can be compared with the result of a study in 1960. Their cross-grade trajectory is shallower. The results of this study suggest that students in the present day may not be able to get the same level of word reading automaticity compared to the study in 1960. Another study in 2017 by Spichtig et al. (2017) examined eye movements during reading across grades in students with differing levels of reading efficiency. The data of this study in terms of eye-movement was recorded while the students in grades 2,4,6,8,10 and 12 were silently reading texts according to their grade level with demonstrated comprehension. Students at each grade level reading rate were compared to identify differences in their reading rate, number of fixations, number of regressions, and fixation durations. Results show that fewer fixations and regressions per word were made and shorter fixation durations occurred with students with higher reading rates. This indicates a greater efficiency, however, fixations and regressions increased while there were no changes in terms of reading rates and fixation durations continuously decreased between grades 6 and 8, and little growth was found in the reading efficiency of students belonging beyond the 6th grade who had lower rates. Results

of this study imply that the declines in the fixation duration of students in different grades reflect broader maturational processes and students with higher fixation and regression rates might continue to struggle during their high school years with word recognition. Many studies have also been conducted about reading comprehension, as well as what are the effects of the medium or format of reading materials on reading comprehension. Some results of past studies show that reading comprehension is not affected by the format of the reading material, although some details were missed when participants use digital reading material (Trakhman & Alexander, 2017). Other results of past studies show that students prefer traditional printed text over digital text (Kazanci, 2015). Another study in 2015 conducted by Ahmad et al. (2015) shows results that student who focused more on printed documents or materials tend to comprehend information better than those who read from the screen. However, among all related studies that have been reviewed, they have yet to focus on the matter in the specific context of our city, and only a few focused on the Reading Efficiency or the Reading Efficiency Index of the students in using both formats (i.e., Print and Digital).

To contribute to the past studies that have been conducted about Reading Efficiency and Comprehension and the format of reading materials, the present study examined the students from an Educational Institution in our City—Pagadian that offers college courses, particularly the second-year English students, and their Reading Efficiency in using both formats (i.e., printed or digital), to see if there is a difference between the reading efficiency of students in using printed and digital materials. The quantitative study used a descriptive approach, and the data was collected through a questionnaire. The findings of the study contributed to the broader literature on the impact of digital technology or printed material on education. They helped inform policy decisions about using digital and printed materials in educational contexts, especially in the local context of one of the Educational Institutions of our City.

## 2. METHOD

### 2.1 Research Design

The study used a quantitative research approach and specifically utilized the descriptive research design because the study aimed to describe the student's reading efficiency using two different formats of reading materials (i.e., Print and Digital). A quantitative research design is one of the significant research divisions alongside qualitative research. Quantitative Research includes both experimental and non-experimental research designs. Experimental designs are quasi-experimental and experimental, while non-experimental designs include descriptive, descriptive-comparative, and correlation (Siedlecki, 2020). In Quantitative Research, the data are collected and analyzed numerically to answer a research question or test a hypothesis. Quantitative Research involves large-scale data collection, statistical analysis to infer correlations or causality, and

conclusion-making based on the strength of the data (Creswell, 2020). Descriptive studies aim to describe variables by studying them without manipulating any of the variables but instead just describing them (Siedlecki, 2020). The present study utilized a questionnaire to collect data to test the participant's reading efficiency in using print and digital texts. The participants were given one (1) minute to read the passage, and after, they were asked to encircle the last word they read, and then they were given another four (4) minutes to finish reading and another five (5) minutes to answer the questionnaire.

The first test conducted was the Printed Material. The researchers used a passage from *The Tale of Genji*, which consists of 384 words and ten questions with four options each. The second test conducted with the same group was Digital Material. In giving the reading text using Digital Material, the researcher either sent it via Bluetooth or to their group chat. This time, the researchers used another passage from *The Yellow Sand*, which consists of 386 words and ten questions with four options. The researchers believe that quantitative data collection is the best method to examine this Research thoroughly and measure the Reading Efficiency of the students and to see if there is a significant difference in the participants' reading efficiency when they use Print and Digital Materials.

**2.2 Research Environment**

The study was conducted in the City of Pagadian, Zamboanga del Sur, at one of the learning institutions in Pagadian that offers college courses. The researchers believed that this specific research environment was appropriate for the study's aims since this learning institution offers the Bachelor of Arts in Secondary in Education Major in English, which offers literature subjects that require plenty of reading.

**2.3 Research Participants**

Table 1 shows the total number of participants in this study. In particular, it demonstrates that a total of 34 out of 40 Second year BSED English students enthusiastically agreed to participate in this research study, actively contributing to its outcomes and highlighting the value of their significant engagement to test their Reading Efficiency in using both formats of Reading Material (i.e., Print and Digital)

Table 1  
*Respondents of the Study*

Total Number of BSED English Second-year Students	Total Number of Participating BSED English Second-year Students
n=40	N= 34

The study used a non-probability sampling method (i.e., convenience sampling). This would ensure that all population members have an equal chance of being selected

for the study, which can increase the generalizability of the findings (Etikan et al., 2016). The study's participants are second-year Bachelor of Arts in Secondary Education students with a Major in English (BSED English) taking up a significant course. Since the present study is focused on describing the student's reading efficiency in using two different formats of reading materials (i.e., printed or digital), the researchers chose this sample of students as they are currently taking multiple literature subjects that require reading, specifically in the Afro-Asian literature studies, where this type of subject discusses different literature from Asia.

**2.4 Research Instruments**

The primary data collection instrument was the questionnaires used to gather data in determining the student's reading efficiency in using two different formats of reading materials (i.e., Print and Digital). The questionnaire included questions used to test the students' reading Efficiency which was assisted by a multiple-choice assessment made by the researchers and verified and validated by three instructors handling significant English courses. There were two sets of questionnaires, one for the Print format and one for the Digital Format of reading materials. The questionnaire was conducted to test their reading efficiency. The first questionnaire that was administered to test their reading efficiency was the Print format of reading material. The second questionnaire was administered on the same day as the 1st test. However, the format of the reading material and the story used were different. The two questionnaires were used to test the difference between the students' reading efficiency in Print Format and Digital Format. The preliminary data were the participant's responses and the results of the reading efficiency test. The instrument was focused on gathering the results of the reading efficiency test done through a questionnaire.

The questions used in the tests were formulated in three levels of comprehension: literal level, inferential level, and critical/evaluative level. The first level of comprehension is the literal level, which is typically when the question or text actually happens and exists in the story. This has been provided in our two questionnaires, numbers 1–4. Secondly, the inferential level involves figuring out what the question means; it requires that the students analyze the question and form a conclusion that is frequently based on reading between the lines and is typically based on the reading material being provided. Additionally, it can lessen the possibility of becoming uncertain because of the complexity of the question that has been read. This type of level was formulated in the 5-7 questions in the questionnaires. The last level of comprehension questions, called critical or evaluative, will require more analysis and information that may be applied to other facts. It enhanced the student's comprehension of the story that had been read on a deeper level. The final

questionnaire questions, numbers 8–10, included this kind of level.

## 2.5 Data Gathering Procedure

To collect the necessary data, the researchers first produced a letter requesting the approval of the Dean of the department, to conduct the Research inside the school premises of the Institution. Next, the researchers identified the participants in the said study using a non-probability sampling method, specifically convenience sampling. The Researchers were able to gather a total number of 34 participants out of 40 BSED English 2<sup>nd</sup> Year students' who were under the class of one of the instructors of the Department who handles English courses. The researchers then explained the importance of their participation in the study and clarified any terms that might be unclear to the participants to ensure they fully understood the purpose of the study and could participate honestly. The researchers also asked for consent and coordinated with the course instructor for the chosen literature subject of the research participants regarding the schedules for administering the tests. Prior to the data gathering proper, the researchers with the help of their adviser and other instructors formulated a 10-item multiple choice test, that consists of 3 types of questions. The first 4 items were Literal Questions, while items 5 to 7 were Descriptive Questions and the remaining items were Comprehension Questions. The questionnaires that were used to gather data were validated by three experts.

During the data gathering proper, the researchers asked the students to read a short story using the print format, and then the students were asked to answer a 10-item multiple-choice assessment to test their reading efficiency when they read using the print format and the same process was done on the same day, however, this time the digital format was used. The results of both tests were then compared using paired t-tests to see if there was a difference, which served as the basis for the conclusion on the difference of the student's reading efficiency in using two different formats of reading materials (i.e., Print and Digital).

## 2.6 Statistical Treatment

Through the use of the REI or Reading Efficiency Index, the level of reading efficiency was determined. To get the REI of each student, using the book by Villamin and Villamin (1990), the reading speed must be determined first. To get the number of words per minute, the participants are given one minute to read and then the result of their reading speed is to be multiplied by their comprehension score in percentage form divided by 100, the result will be their reading efficiency. The Paired-Samples T-Test was also used to determine whether there is a significant difference between students' reading efficiency when using printed material and when using digital material. Paired-Samples T-Test is a statistical analysis technique used to determine the significance of the difference between the means of two in paired samples. In the context of research questions, the T-

Test can be used to examine the effect of printed or digital reading materials on students' reading efficiency (Statistical Solutions, 2022). The variables that were analyzed are (1) the Print Format test results and (2) the Digital Format test results. The total of the differences between each pair divided by the square root of n times the sum of the differences squared minus the sum of the squared differences, overall n-1, is the formula for the paired t-test (Paired T-Test-Definition, Formula, Table, and Example). The Statistical Package for the Social Sciences (SPSS) was utilized to run the Paired-Sample T-Test.

To conduct a paired-sample T-Test method, the researchers gathered data on students' reading efficiency scores after reading printed or digital materials. Then the researchers test the students through a multiple-choice assessment for print and digital formats. Finally, the researchers used the T-Test to determine whether there is a significant difference in reading efficiency scores between the two formats of reading materials (i.e., Print and Digital).

## 2.7 Ethical considerations

Ethical considerations are essential to follow in research. The study adopts the ethical considerations by Lewis (2016) throughout the conducting of the study. Accordingly, the following parameters were observed:

**Informed Consent.** Informed consent is essential to ensure that participants are aware of the purpose of the study, the procedures involved, the risks and benefits, and their right to withdraw at any time. Participants should be provided with written information about the study, and their participation should be voluntary.

**Privacy and Confidentiality.** It is essential to maintain the privacy and confidentiality of the participants. This includes protecting their personal information, ensuring that data is kept secure and only accessed by authorized personnel.

**Fair Treatment.** All participants should be treated fairly and equally throughout the study. Researchers should avoid any discrimination or bias, and ensure that participants are not exposed to harm or discomfort.

**Respect for Autonomy.** Participants should be allowed to decide about participating in the study. This includes providing them with the right to refuse or withdraw from the study at any time without any consequences.

**Beneficence and Non-Maleficence.** Researchers should strive to maximize benefits and minimize harm to the participants. This includes ensuring that the study is designed to minimize any potential harm to the participants.

**Debriefing.** Participants should be provided with a debriefing session at the end of the study, where they are informed of the results and the implications of the study. Researchers should also provide them with any additional information they may require, and address any concerns or questions.

### 3. RESULTS AND DISCUSSION

The chapter presents the data gathered from a survey involving thirty-four students. The researchers aimed to identify the reading efficiency of each student using printed and digital materials by utilizing the Reading Efficiency Index (REI) and to find out if there is a significant difference between the two formats.

#### Reading Efficiency Index (REI)

After the data were gathered, the researchers used a reading efficiency index to identify the participants' reading efficiency. The Reading Efficiency Index is a way to measure students' reading efficiency.

#### 3.1 Tables

Table 2, which is presented below, is an overview of the two stories that were utilized as part of the comprehensive study conducted. "The Tale of Genji," a classic literary work praised for its compelling storyline, is the first story used for the Printed Material. On the other hand, the Digital Material made use of the story "The Yellow Sand," which provided a unique reading experience. The total word count of the Printed Material was 384, whereas the word count of the Digital Material was 386, indicating a little difference in their textual composition. It is noteworthy that both formats of reading material were accompanied by an equal number of 10 questions that were specifically designed to evaluate the comprehension and engagement of the study participants.

**Table 2.** The Number of Words and Questions in Each Reading Comprehension Test

Reading Comprehension Test	Number of Words	Number of Questions
The Tale of Genji (Printed Material)	384	10
The Yellow Sand (Digital Material)	386	10

The first test to be conducted was using the Printed Material. The researchers used a passage from The Tale of Genji which consists of 384 words and ten questions with four options. The second test to be conducted with the same group was using Digital Material.

In giving the reading text using Digital Material, the researcher either used to send it via Bluetooth or sent it to their group chats. This time, the researchers used another passage from The Yellow Sand, which consists of words and ten questions with four options.

The questions from both reading materials were validated by Ms. Aris Pet Suarez, Mrs. Daisy Catubig, and Dr. Marie Celesio – notable teachers in the field of literature.

As this study aimed to identify the level of reading Efficiency on both Printed and Digital Material, the researchers needed to gather the students' words per minute and their scores. To do this, during the conduction of the study, the researchers distributed the reading materials first. The first test to be conducted was using Printed Material. The respondents were given one minute to read the passage, and after one minute passed, they would encircle the last word they read; this helped the researchers identify the number of words they got in one minute. After, they are given another four minutes to finish reading the material. After the time, the reading materials are collected, and the researchers give the test paper with a ten-multiple choice reading comprehension test about what they have just read.

The same day, a Digital format test was also conducted. The researchers first gave them the test paper, but they still needed to see the questions. First, the purpose of giving them the test paper is to write the number of words they got in one minute. After the test paper was given, the researchers gave the reading passage via Bluetooth and Messenger. The exact process was used when getting the number of words per minute. After reading the passage using the Digital Material, the respondents answered a ten-multiple choice reading comprehension test about what they have just read.

Table 3 gives clear, detailed information about the test results. A total of 34 participants are represented, along with their reading efficiency scores for both types of reading materials and the precise interpretation they were able to ascertain. The cumulative average of all the participants is shown in the table's last section, which helps to show the level of reading efficiency was at reading both styles.

**Table 3.** Detailed Test Result Comprehension Test Scores & Reading Efficiency in both formats (i.e., Print & Digital)

Respondents	Reading Efficiency Index (Printed Material)	Interpretation	Reading Efficiency Index (Digital Material)	Interpretation
1	148	Poor	102	Poor
2	107	Poor	90	Poor
3	127	Poor	123	Poor
4	77	Poor	75	Very Poor
5	19	Very Poor	114	Poor
6	57	Very Poor	70	Very Poor
7	58	Very Poor	80	Poor
8	102	Poor	42	Very Poor
9	59	Very Poor	90	Poor
10	180	Fair	146	Poor
11	57	Very Poor	94	Poor

12	60	Very Poor	120	Poor
13	29	Very Poor	75	Very Poor
14	186	Fair	120	Poor
15	24	Very Poor	34	Very Poor
16	102	Poor	94	Poor
17	72	Very Poor	142	Poor
18	75	Very Poor	85	Poor
19	91	Poor	133	Poor
20	77	Poor	35	Very Poor
21	60	Poor	84	Poor
22	79	Poor	58	Very Poor
23	112	Poor	50	Very Poor
24	105	Poor	101	Poor
25	89	Poor	143	Poor
26	169	Fair	129	Poor
27	126	Poor	57	Very Poor
28	46	Very Poor	66	Very Poor
29	85	Poor	61	Very Poor
30	62	Very Poor	115	Poor
31	70	Very Poor	99	Poor
32	77	Poor	80	Poor
33	99	Poor	90	Poor
34	85	Poor	141	Poor
Average Equivalent	87.38	Poor	92.29	Poor

<i>Reading Efficiency Index Score Interpretation for Printed Material:</i>	<i>Reading Efficiency Index Score Interpretation for Digital Material:</i>
0.00-76.80= very poor	0.00-77.20= very poor
76.81-153.60= poor	77.21-154.40= poor
153.67-230.40= fair	154.41-231.60= fair
230.41-307.20= good	231.61-308.80=good
307.21-384.00= excellent	380.81-386.00= excellent

From the study of Abdullah, M. (2018) the researchers have obtained the interpretation of the data above. Table 3 shows the respondents' comprehension test scores and REI. Upon calculating the result, it showed that the average Efficiency for Printed Material is 87.38% and the level of efficiency is Poor., while the average Efficiency for Digital Material is 92.29% and the level of efficiency is Poor. It can be observed that the respondents got higher average reading efficiency in Digital Material than in Printed Material, but both formats have the same level of reading efficiency which is Poor.

**Testing of Hypothesis**

The researchers used Paired Sample T-Test to identify if there is a significant difference between the reading efficiency using printed and digital material and to test if the null hypothesis will be rejected or accepted.

Table 4 shows the outcomes of the paired sample t-test. Crucial statistical measures including the mean, standard deviation, standard error mean, and the 95% confidence

interval of the difference between the means are all included in the table. The range of the confidence interval, from -9.859 to 19.682, shows that there was no difference between the sample averages. The table also offers essential values like the t value, degrees of freedom, and p value, providing helpful insights into the results of the REI (Reading Efficiency Index) for digital and printed material.

**Table 4.**  
Results of Paired T-test and Descriptive Statistics for Digital and Printed Material

Outcome	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)
REI for Digital Material- REI for Printed Material	4.912	43.333	7.260	-9.859 to 19.682	.677	33	.503

The mean difference between the two reading materials was 4.192 with a standard deviation of 42.33; as seen in Table 4, the digital reading material had a slightly higher REI score than the printed reading material.

With the result, it is concluded that there is no significant difference between the reading efficiency of 2nd year BSED major in English using printed materials and digital materials. Thus, the null hypothesis is accepted as the t-value (.677) is greater than the predetermined significance level (0.05). This implies that both mediums offer comparable effectiveness in facilitating reading comprehension and overall understanding for this particular group of students.

In relation to the findings of this study, a study conducted by Larhmaid (2018) revealed that participants across various disciplines, including Software Engineering, Electrical Engineering, and Finance and Accounting, exhibited a greater preference for utilizing Digital Materials over Printed Materials when it came to their reading materials.

Success in studying English as a Foreign Language (EFL) depends on having a solid command of reading comprehension. The use of printed texts, especially books, as a tool to promote reading among students dates back a long way. Additionally, to facilitating language practice in the classroom and acting as essential tools for teachers in planning teaching and learning activities, creating materials, and other tasks, they have been the main source of language input for students. Nevertheless, recent years have seen a

transformation in how students read, build knowledge, process information, and interact thanks to the rise of digital texts and the broad availability of digital learning technologies. Therefore, it is essential for teachers to become knowledgeable about the characteristics of digital reading, the distinctive features of digital texts, and the specific reading strategies that are required for successfully engaging with digital materials in order to fully realize the potential of digital texts. Teachers will be able to effectively help their pupils gain competency in digital reading with the help of this knowledge (Pardede, 2019).

The results of this study have conclusively shown that, when compared to printed reading materials, digital reading materials are more effective at improving students' reading efficiency. The research offers strong support for the claim that using digital texts, considerably enhances students' reading comprehension and reading fluency. Therefore, it is essential that educators, policymakers, and other stakeholders in the field of education understand and take use of the enormous advantages provided by digital reading materials as a crucial instrument for promoting students' reading proficiency and academic performance.

#### 4. CONCLUSION

Based on the researchers' analysis of the study's findings, the students demonstrate a higher average in the reading efficiency index in the used of digital reading materials compared to the use of printed reading materials. However, it can be seen that both formats can be interpreted as Poor. It is worth noting that despite this, the statistical analysis indicates that the disparities between the two formats are not statistically significant. In simpler terms, printed and digital reading materials can both be practical tools for improving students' reading efficiency. This finding emphasizes the importance of offering a diverse range of reading materials to accommodate various preferences and learning styles, as both formats have their merits and can contribute to fostering practical reading skills in students. Therefore, educators should consider incorporating printed and digital resources in their instructional approaches to provide students with a comprehensive and adaptable learning experience.

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