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การรู้ดิจิทัลเพื่อการอ่านภาษาอังกฤษเร็ว : การวิจัยเชิงอรรถาธิบาย

Digital Literacies for English Reading Fluency: An Explanatory Study

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บทคัดย่อ

งานวิจัยแบบผสมผสานนี้มีวัตถุประสงค์เพื่อ 1) ศึกษาการรู้ดิจิทัลเพื่อการอ่านภาษาอังกฤษเร็วในแง่ของอัตราการอ่านภาษาอังกฤษเร็วและความเข้าใจในการอ่านภาษาอังกฤษเร็วของนักศึกษา 2) เพื่อศึกษาการใช้การรู้ดิจิทัลของนักศึกษา กลุ่มตัวอย่างของงานวิจัยประกอบไปด้วย นักศึกษาระดับปริญญาตรี ชั้นปีที่ 3 ประจำปีการศึกษา 2563 คณะสถาปัตยกรรมศาสตร์ จากมหาวิทยาลัยรัฐบาลแห่งหนึ่งในประเทศไทย จำนวน 60 คน เครื่องมือที่ใช้ในการวิจัยได้แก่ 1) ข้อสอบประเมินการอ่านเร็วก่อนและหลังเรียน 2) แบบบันทึกแผนภูมิฝึกการอ่านภาษาเร็ว 3) แบบบันทึกการเรียนรู้ สถิติที่ใช้ในการวิเคราะห์ข้อมูลประกอบด้วยการทดสอบค่าที (paired sample *t*-test) และใช้การวิเคราะห์โดยการกำหนดรหัส (coding analysis) ผลวิจัยพบว่า 1) นักศึกษามีผลคะแนนหลังเรียนมากกว่าผลคะแนนก่อนเรียนจากการสอนโดยใช้กลวิธีการรู้ดิจิทัลต่อการอ่านภาษาอังกฤษเร็วทั้งอัตราการอ่านภาษาอังกฤษเร็วและความเข้าใจในการอ่านภาษาอังกฤษเร็ว อย่างมีนัยสำคัญทางสถิติที่ .05 ขนาดผลอัตราการอ่านภาษาอังกฤษเร็วคือ .71 และขนาดความเข้าใจในการอ่านภาษาอังกฤษเร็วคือ .40 2) รายงานจากแบบบันทึกการเรียนรู้เป็นไปในเชิงบวกต่อองค์ประกอบหลักทั้งสี่ในการรู้ดิจิทัล คือ (1) การสื่อสาร (2) ข้อมูล (3) การทำงานร่วมกัน และ (4) การออกแบบใหม่ การวิจัยอธิบายว่าแต่ละองค์ประกอบช่วยเพิ่มการอ่านภาษาอังกฤษเร็ว ซึ่งสามารถนำเสนอเป็นแนวทางสำหรับการบูรณาการการรู้ดิจิทัลเพื่อการอ่านเร็วในการเรียนภาษาอังกฤษได้อย่างมีประสิทธิภาพ

คำสำคัญ : การรู้ดิจิทัล, การอ่านเร็ว, อัตราการอ่าน, ความเข้าใจในการอ่าน

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Abstract

This mixed-methods study aimed 1) to examine the effects of Digital Literacies on English reading fluency in terms of English reading rate and English reading comprehension for undergraduate students, and 2) to investigate undergraduate students' uses of Digital Literacies. The participants consisted of 60 third-year undergraduate students from the Faculty of Architecture at a public university in Thailand in the 2020 academic year. The instruments were 1) Online English Reading Fluency Test (pretest and posttest), 2) English Reading Fluency Practice: Reading Rate Chart, and 3) Learning Logs. The data were analyzed using paired sample *t*-test and coding analysis. The results demonstrate that 1) the paired sample *t*-test reveals that students significantly increased their Digital Literacy for English reading fluency at a significant level .05, with a small sized effect of .40 in English reading rate, and a medium sized effect of .71 in English reading comprehension, and 2) students reported positively upon four elements of Digital Literacies, including (1) Communication (2) Information (3) Collaboration, and (4) (Re-) Design. The study explains how each element enhances English reading fluency and offers guidelines for integrating Digital Literacies into English reading instruction.

Keywords: digital literacies, reading fluency, reading rate, reading comprehension

Introduction

Promoting students' digital literacy has become an increasingly significant challenge for educators and course designers in the 21st century (Dashtestani & Hojatpanah, 2020). Digital literacy has been applied to teach pedagogy, which, consequently, enhanced appropriate skills for students. Digital transformation and the internet strongly affect students' skills to support their education and their professional world. Building foundations for students in higher education to be digitally literate is a crucial responsibility of universities (Techataweewan & Prasertsin, 2018) worldwide, including in Thailand. One of the implications of connecting classrooms with digital technologies is that students are offered rich engagement of disciplines to participate and collaborate with authentic learning. Additionally, for educators, using digital tools to encourage disciplinary learning has been challenging because technologies require a lot of time and collaboration (Goss et al., 2016). Youths and adults deserve opportunities to be able to read and write. The use of words and digital technologies enable significant access and a possibility for conception and communication (Castek & Manderino, 2017).

Reading is one of the strategies to facilitate learning and integrate students into disciplinary knowledge. The concept of reading nowadays could be different from what it was

once defined due to the access to reading resources and various forms of reading through digital technology (Liaw & English, 2017). Nevertheless, how undergraduate students perceive reading affected reading assignments because they expected to achieve targeted reading (Gorzycki et al., 2019). Reading, writing, and communicating in digital scopes demanded a wider domain of skills and masteries relating to digital culture and understanding social contexts rather than relying only on print-based literacies (Tour, 2019). Therefore, the implementation of digital literacies for English reading fluency is recognized as an essential element for struggling Thai EFL readers.

Digital Literacies

Digital Literacies was defined as the ability to process the use of technology and literacy skills in language learning, consisting of four main components: (1) Communication (Language), (2) Information, (3) Collaboration, and (4) (Re-) Design (Pegrum et al., 2018). The abovementioned process transformed disciplined learning in reading, writing, speaking, and interpretation skills into practice (Dobbs et al., 2017). The method also included three steps implemented in Disciplinary Learning: (1) Assess and Evaluate Information, (2) Use and Represent Information, and (3) Produce and Exchange Information (Castek & Manderino, 2017).

(1) Communication

Communication or Language was defined as a set of abilities to effectively comprehend, interpret, and create text through print or media using the knowledge of linguistic features, such as grammar and vocabulary associated with reading and writing skills. Multimodal literacy was used to help students interpret texts in multiple media such as images, sounds, and videos.

(2) Information

Information was defined as the ability to effectively use search engines and document evaluation to assess content's credibility through Search and Information literacy, such as asking critical questions, comparing sources, tracking the roots of information, and searching beyond filter bubbles.

(3) Collaboration

Collaboration was defined as creating awareness and effectively using information from the individual to intercultural aspects concerning the ethical environment. Personal literacy or security used digital tools to shape and project the identity when referencing the sources.

(4) (Re-) Design

(Re-) Design was defined as developing new meanings by interpretation through Communication, Information, and Collaboration. The process also included evaluating, appreciating, taking positions, and engaging information in an online environment with technological innovations and implications. Critical literacy involving digital tools allowed students to engage in meaningful academic research with new technologies.

English Reading Fluency

English Reading Fluency was defined as a reading rate of 200 words per minute (wpm) with 70% reading comprehension (Anderson, 2018). Developing word recognition could be carried out through timed reading activities, which was crucial in promoting English reading fluency (Grabe & Stoller, 2020a).

Reading Rate

Reading rate was generally defined as reading 200 words per minute. Rate Buildup Reading practice was a pedagogical practice to keep students focused on a fluency goal as they read a given text in 60 seconds for three cycles. As they got familiar with the text in each reading process, students learned how to increase their reading rate (Anderson, 2018). Although, the reading rate was reported as one of the critical elements of English reading fluency, it could not be relied upon as the solitary one (Zwick, 2018). However, Ari (2015) found that repeated readings appeared to encourage reading strategies, which helped struggling readers.

Reading Comprehension

Reading comprehension was defined as the ability to understand and interpret information from a text accurately. The data was synthesized from reading sources that could be represented online and in print to correspond to academic purposes (Grabe & Stoller, 2020b). Although, reading comprehension in L2 educational settings was one of the essential complex language abilities needed by L2 students (Grabe 2016). Anderson (2018) defined reading comprehension as the ability for students in Higher Education remove to engage and understand a reading passage with 70% comprehension. Critical terms identified here referred to reading comprehension processes and instructions (Duke et al., 2021).

While many scholars measured students' English reading comprehension through vocabulary and background knowledge and working memory of various kinds of text types or graphical overview (Fesel et al., 2018), the idea was supported by Serrano & Huang

(2018) that people with higher capacity engaged better with reading comprehension. Therefore, there were no data collected in a vocabulary test to evaluate the speed of lexical access. However, Ma'rof (2014) argued that students' reading comprehension could be improved when students engaged in meaningful discussion about the texts. This also supported the view that reading comprehension was a complex process requiring complicated interaction among multiple skills and factors (Shin et al., 2019). Hence, the overview has led to the interpretation of reading comprehension from another perspective.

Objectives

1. To examine the effects of Digital Literacies on undergraduate students' English reading fluency.

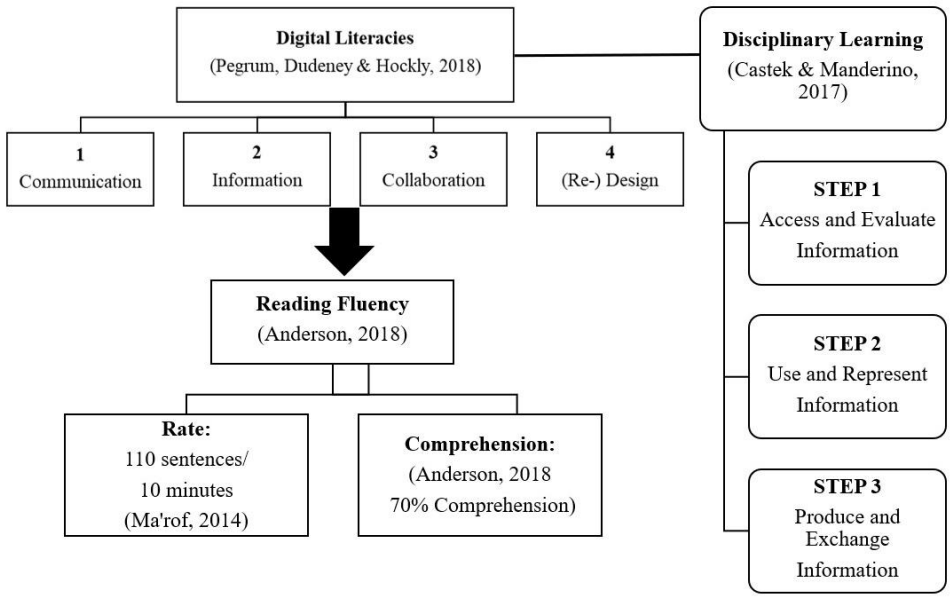
2. To investigate undergraduate students' uses of Digital Literacies.

Methodology

Research Framework

Figure 1

The conceptual framework



Context and Participants

The mixed-methods study used a one-group pretest-posttest design with a pretest and a posttest of Online English Reading Fluency Test. The pair sample *t*-test was used to analyze students' mean scores on the pretest and posttest. The data was presented in descriptive statistics. In addition, coding was used to categorizing the data into codes from students' Learning Logs.

The participants of this study were Thai undergraduate students studying in a public university in Thailand. Sixty third-year Thai undergraduate students were majoring in the Architecture program. A purposive sampling technique was used to select the participants. The study was constructed online throughout the entire semester.

The study was divided into two phases. The first phase was the preparation of Digital Literacies for English reading fluency intervention. For example, exploring and studying the reading topics in architecture and designing and creating Digital Literacies for English reading fluency plans and materials. The second phase was the Digital Literacies for English reading fluency intervention.

Research Instruments

Three main instruments were used for the study: (1) Online English Reading Fluency Test, (2) English Reading Fluency Practice, and (3) Learning Logs.

(1) Online English Reading Fluency Test

The test was constructed as a pretest and posttest to assess students' English Reading Fluency in terms of reading rate and reading comprehension using an online test generator, 'Flexiquiz.' The test items were developed based on materials and instructions of Digital Literacies on English Reading Fluency. The excerpts from the materials were used. Adopted from Ma'rof (2014), the test aimed to show how students could read at an appropriate reading rate and comprehend sentence reading at the proper level. Students were given a 20-minute test of 110 true-or-false questions consisted of 2,000 words. The criterion in developing 110 true-false questions was based on vocabulary knowledge, prior knowledge, and working memory (Fesel et al., 2018).

It should be noted that the abovementioned data only focused on were not collected, only focused on reading rate and the overall score of reading comprehension. This English reading fluency test measured students' reading rate at 200 words per minute with 70%

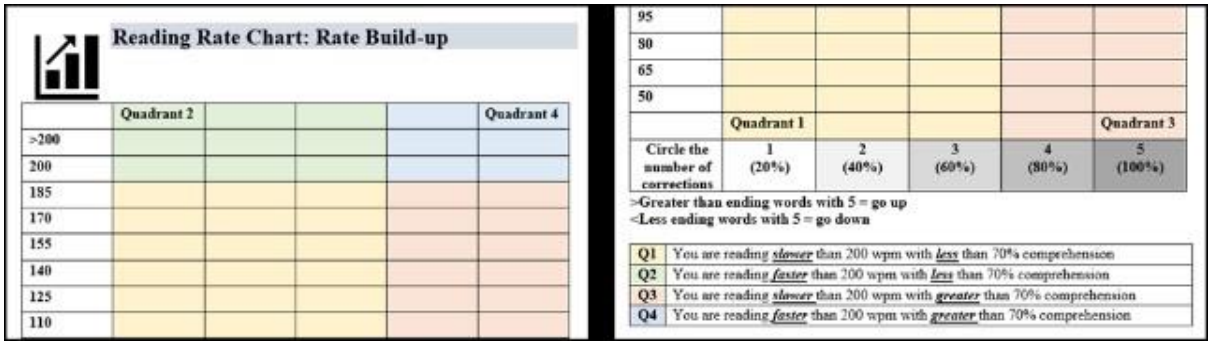
comprehension, as Anderson (2018) proposed. The test items were developed based on Digital Literacies for English reading fluency plans and materials. Three experts and pilot-tested validated the test to ensure its reliability before the main study.

(2) English Reading Fluency Practice: Reading Rate Chart

English Reading Fluency Practice: Reading Rate Chart measured students' reading rate at 200 words per minute (wpm) with 70% comprehension based on Anderson (2018). The practice consisted of a lesson plan developed in three Units. Each unit contains a 200-word passage with five comprehension questions and an English Reading Fluency Practice: Reading Rate Chart to record their reading rates. Students were asked to read a selection three times with given one minute per reading each time. After students finished reading the first time, they recorded word count on the chart (Figure 2). Then they repeated the same process the second and third times. The reading passage and context were relatively based on students' discipline in architecture. The pedagogical implications consisted of the following activities: (1) Rate Buildup Reading, and (2) Repeated Reading and Tracking Process. The students were expected to reach level Q4. Another three experts validated Item-Objective Congruence Index (IOC) was acceptable, which indicated that the format was suitable for students to practice their English reading fluency. The English Reading Fluency Practice was pilot tested before the main study.

Figure 2

Example of English Reading Fluency Practice



Reading Rate Chart: Rate Build-up

	Quadrant 2				Quadrant 4
>200					
200					
185					
170					
155					
140					
125					
110					

95					
80					
65					
50					
	Quadrant 1				Quadrant 3
Circle the number of corrections	1 (20%)	2 (40%)	3 (60%)	4 (80%)	5 (100%)

>Greater than ending words with 5 = go up
<Less ending words with 5 = go down

Q1	You are reading *slower* than 200 wpm with *less* than 70% comprehension
Q2	You are reading *faster* than 200 wpm with *less* than 70% comprehension
Q3	You are reading *slower* than 200 wpm with *greater* than 70% comprehension
Q4	You are reading *faster* than 200 wpm with *greater* than 70% comprehension

(3) Learning Logs

Learning Logs were used to investigate students' uses of Digital Literacies at the end of each unit. Students were encouraged to write down their reflections on the Digital Literacies, such as favorable or unfavorable parts of the Digital Literacies interventions, reasons and perspectives on digital technology used in the learning units, and progress on the English reading fluency practice.

Data Collection and Analysis

The Online English Reading Fluency Test was administered to assess students' English reading fluency on reading rate and comprehension. Before the interventions, students received an overview of the course. The content of each unit and classroom practice were also explained. They participated in the Digital Literacies Intervention with three units for 10 weeks. At the end of each unit, students recorded their reading practice rate on the English Reading Fluency Practice: Reading Rate Chart. At the end of the intervention, the Online English Reading Fluency Test was administered as a posttest to compare the students' English reading fluency results. In addition to the end of each unit, and learning logs were distributed. Learning Logs were collected and used to analyze their Digital Literacies. Out of all students, 6 were reported to have the highest and lowest 10%.

For the quantitative analysis, students' Online English Reading Fluency Test scores on reading rate and comprehension were compared to examine the effects of the intervention using the pair samples *t*-test and effect size (d). Descriptive statistics were calculated to report the overall group's mean scores and standard deviation (*SD*) for the reading rate and reading comprehension. The qualitative data were analyzed using coding analysis from students' Learning Logs at the end of each learning unit. Students' Learning Logs were selected based on their posttest scores between the range (10%) of the highest and lowest scores in the distribution

Research Findings

Research Objective 1 focuses on the effects of Digital Literacies on undergraduate students' English reading fluency. The findings were reported into two tables in terms of reading rate and reading comprehension.

Table 1 shows that students made a significant improvement (t (59) = 5.58, $p < 0.05$) with a medium effect size of .71 (d = .71) on their reading rate after 10 weeks.

Table 1

Reading rate

Variable	*M*	*SD*	Min	Max	*t*-test	df	Sig.	d
Pre-test	19.15	1.20	12.2	18.08	5.58	59	.000	.71
Post-test	17.33	2.82	8.4	17.23				

Note: N = 60

Table 2 shows that students made a significant improvement (t (59) = t-3.11, $p < 0.05$) on their reading comprehension pre- and post-test after 10 weeks of the implementation. The effect size was .40 (d = .40), indicating a small effect size.

Table 2

Reading comprehension

Variable	*M*	*SD*	Min	Max	*t*-test	df	Sig.	d
Pre-test	63.78	17.03	26	96	*t*-3.11	59	.003*	.40
Post-test	72.76	14.71	27	98				

Note: N = 60

Research Objectives 2 deals with undergraduate students' uses of Digital Literacies by analyzing their Learning Logs.

Students' Learning Logs were analyzed to explain how students used the English Reading Fluency Practice: Reading Rate Chart to record their English reading fluency practices and how each element of Communication, Information, Collaboration, and (Re-) Design was used. Students were encouraged to write their Learning Logs and were free to choose whether to record their reflections in Thai or English. Apart from understanding how students related Digital Literacies to reading fluency, students reflected their reading abilities, such as reading strategies and styles developed during the class. As a result, students picked up what they practiced on the English Reading Fluency Practice: Reading Rate Chart and reported in Learning Logs

English Reading Fluency Practice: Reading Rate Chart

Repeated reading affected a student's English reading fluency since the students defined reading as a process that involves collecting as much information from the text as possible and reading a reader more than once reflected how they interpreted information.

"On the first and second reading, I tried to read and collect the information as much as possible. Also, I am not that familiar with the vocabulary, so it made me read quite slow, and it took time to catch the concept of the article. But when I read it the third time, because I had read it before, I started to read faster."

(Student #L2: Unit 2: Interior Design, personal communication, 4 February 2021)

Reading speed at the appropriate rate had an impact on students' reading comprehension. It was reported that improving English reading fluency required time to absorb information to make precise predictions.

"I like speed reading and answer the questions. This activity has made me see myself clearer on the point where I was not well-aware of reading. I could indeed read fast, but I made a wrong assumption, some items I did not read through the whole statement. This has shown me how I should improve my (English) reading fluency...."

(Student #H1: Unit 1: Profession of an Architect, personal communication, 28 January 2021)

Skimming reading style was reported that it helped a student to have an awareness for developing English reading fluency.

"My reading progress slightly improved. The word choice of each paragraph is basic and not hard to read. But I think the skill that I need to improve on is skimming style reading that can grasp the main structure of the passage, which I didn't do well."

(Student #H2: Unit 2 Interior Design, personal communication, 4 February 2021)

Table 3 shows the summary of the reading rate chart from three learning units. The average words per minute (wpm) for reading in Unit 1 were 114, 147, and 176 words per minute, respectively. The average number of correct items from reading comprehension questions was three out of the total five. Students' English reading fluency was at the average of Q2. It can be inferred that they read faster than 200 words per minute with less than 70% comprehension. Students gradually increased English reading fluency with a less appropriate level of cognition overtime during the intervention.

Table 3

English Reading Fluency Practice: Reading Rate Chart

	Words per minute (wpm)			Number of correct items (5 questions)	Quadrant
	1st	2nd	3rd		
Unit 1	114	147	176	3	Q2
Unit 2	141	173	188	3	Q3
Unit 3	144	168	194	4	Q4

Note: N = 60

Digital Literacies

As the framework of Digital Literacies had four components itself, it revealed that Digital Literacies is essential in conducting online classes.

"Online classes make Digital Literacies a good choice for learning...."

(Student #H3: Urban Design and Landscape Architecture, personal communication, 6 May 2021)

(1) Communication

For students with the lowest range scores on the posttest, it was reported that they preferred Communication since they had a chance to watch online clips, which helped them gain listening skills, comprehension, reading, and writing. Also, Communication offered them to improve their analytical skills.

"I felt communication reflects the task that I have been learning because I have watched content I have never seen before, and it has helped me to practice English essential skills needed...."

(Student #L1: Profession of an Architect, personal communication, 28 January 2021)

In addition, the study revealed another aspect for students that the activity had made them enthusiastic about learning since there were interactions between peers. The findings also revealed that memorizing graphics from watching media helped students gain more attention by practicing communication with friends.

"I like communication because I get to practice the English language through memorizing graphics from watching the video...."

(Student #L3: Urban Design and Landscape Architecture, personal communication, 6 May 2021)

(2) Information

It was essential to deal with activities. That involved searching for information and interpreting data through reading since they played vital roles as primary factors in making references from sources. Using the right keywords in the search also allowed students to be able to search for information faster.

"The purposes of using technology in this unit helped me develop skills in searching for information and/by using keywords...

(Student #L1: Profession of an Architect, personal communication, 28 January 2021)

However, online search tools offered students a lot of potentials, but the student finally concluded that print-based/ paper-based texts provided the student's opportunity to acquire more in-depth sources.

"Using search tools on the Internet has advantages in terms of time-saving and gaining information more broadly, and as secondary data....

...However, in my opinion, I prefer print-based text reading because you can read more in-depth information ...."

(Student #L1: Profession of an Architect, personal communication, 28 January 2021)

(3) Collaboration

The findings on the Collaboration revealed students' opinions from various perspectives. Most of the students with the highest and lowest scores agreed that

Collaboration as a learning tool or as an activity task had offered the opportunity for them to work collaboratively in groups with friends. When working in collaboration. Students are more confident and more willing to share, speak up, and exchange ideas.

"I like working in collaboration with friends. It seems to me like we still can exchange ideas, even if we are at different places/locations...."

(Student #L2: Interior Design, personal communication, 4 February 2021)

"I have a greater preference for implementing an online domain for learning by collaboration and working in groups...."

(Student #L3: Urban Design and Landscape Architecture, personal communication, 6 May 2021)

(4) (Re-) Design

Students' Learning Logs revealed that (Re-) Design was enjoyable for learning since the students could work in a group and create a presentation. Also, the activity provoked critical thinking skills in English and allowed students to practice speaking skills.

"My favorite part is the Re-design part because it's delightful to work with friends. The assignment allows us to express our ideas outside of the boundaries...."

(Student #H2: Interior Design, personal communication, 4 February 2021)

Discussion

English Reading Fluency

The study investigated the effects of Digital Literacies intervention on English reading fluency in terms of the reading rate and reading comprehension. Anderson (2018) suggested that, for adult L2 readers who were studying in Higher Education, such as a college or university, 200 words per minute (wpm) with 70% comprehension was the expected level.

(1) Reading rate

Online English Reading Fluency tests revealed a significant increase in the students' reading rate. Students were expected to complete the Online English Reading Fluency Tests within a 20-minute time allocation. However, there was one characteristic that the reader should understand about the reading rate. The goal was not to promote speed-reading but rather to address an appropriate rate willingly (Zwick, 2018). Having the test administered in English, which is not a native language, must be considered further because the number of words read per minute would be different, depending on the learning contexts of each country. This also counted for silent English reading fluency, making the words per minute counts increased or decreased.

(2) Reading comprehension

Interestingly, knowledge of vocabulary size had an impact on students' reading comprehension. As stated by scholars cited in Grabe & Stoller (2020a). An advanced L2 reading level requires an L2 recognition vocabulary level of above 10,000 words. However, the benchmark for L2 reading level of at least 2000 words has been debatable until now.

The results from the Online English Reading Fluency pretest and posttest scores showed a significant number of improvements. The total mean score was 73 correct items out of 110 items. However, most of the students could not reach the expected 70% of reading comprehension. Furthermore, the condition of English reading fluency in English could vary according to each student's exposure to the native English speaker.

Digital Literacies

Undergraduate students' reflections on Digital Literacies intervention were collected to explain digital literacies for communication, information, collaboration, and redesign. Pegrum et al. (2018) argued that technological developments played an essential role in cultural, social, and political products. Students were encouraged to think, reflect, and interpret their presentations. Digital literacy was a part of disciplinary literacy, and in turn, disciplinary literacy was a part of disciplinary learning. What marked as a success was that online classes make Digital Literacies meaningful for education. Digital Literacies Instructions were reported to have positive effects on students' L2 learning.

(1) Communication (Language)

Communication played a significant role as it was the first part where students could become familiar with materials and instructions. This part allowed students to investigate their English language knowledge, including vocabulary, grammar structures, and learning content. This encouraged students with the lowest test scores to be exposed carefully to print or media. Moreover, having the experience associated with media also urged students to develop their listening, speaking, writing, and reading skills.

(2) Information

Information had an impact on students with the highest test scores, as searching for information online encouraged students to interpret and use critical thinking to evaluate different sources of information. Students were encouraged to use their reading skills and strategies to raise questions and compare sources online. Although, nowadays, students have

easy access to information, some students still prefer to be exposed to lead through print-based text as it helps them get more precise and accurate information.

(3) Collaboration

Collaboration was the most preferred part for students because they could effectively use data obtained from their classmates. Exchanging and expressing ideas were the vital elements according to the tasks given during the instructions. Students were able to interact with friends through an online classroom environment. Also, students could develop their reading style to have an awareness of reading abilities.

(4) (Re-) Design

By interpreting information through Communication, Information, and Collaboration, students were expected to develop new meanings of academic research using technological tools, as reported by a student that this part helped to provoke their ideas. (Re-) Design part was declared as similar to Collaboration. Only the Collaboration was the part where students worked on the task given.; however, 'redesign' allows Interpreting information students to create new projects of their content. Students made a connection to their field of study as meaningful presentations.

Recommendation for Future Research

The research findings for this study highlight several topics in which further research would be beneficial. First of all, future research should develop research instruments through questionnaires and interviews to gain in-depth information after the intervention of Digital Literacies for English reading fluency. Furthermore, future research should conduct with a greater variety of participants' fields of study. Developing lesson plans for students in different significant areas of study should be taken into account. Moreover, future studies should adopt the Digital Literacies as a conceptual framework with four components in (1) Communication, (2) Information, (3) Collaboration, and (4) (Re-) Design as a learning discipline. In addition, future research should investigate students' English reading fluency, reading skills, or strategies to improve students' reading rate at 200 per minute with 70% comprehension. Currently, even though students accessed their learning through online platforms. Students could engage with the activities but encouraging students' motivation for the online learning environment would be more challenging.

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