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Impact Evaluation of the Digital Learning of English on Students

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Abstract

This action research aims to assess the effect of applying digital learning to English teaching on eighth-graders. The research has been implementation for 12 weeks. Participants consisted of 23 eighth graders. The study's data were collected by classroom dialogue records, reflective notes, collaborative researcher's observational records, discussion records, students' worksheets, feedback, and interview records. Quantitative data analyses included English reading comprehension tests and scales on self-regulated learning. The findings indicated that applying digital learning to English teaching can enhance eighth graders' self-regulated learning abilities and English reading comprehension abilities. However, it's important to note that this study has some limitations, such as the small sample size and the short duration of the study. Based on the findings, recommendations for schools, teachers, and future studies are also included.

Keywords: digital learning, English reading comprehension ability, self-regulated learning ability

1. Introduction

With the rise of technology and the widespread use of mobile devices, information technology has revolutionized how teachers teach and students learn. Teachers have transitioned from using traditional tools like paper, chalk, and blackboards to incorporating projectors, e-books, and app platforms. This shift empowers educators, allowing them to utilize online platforms, tablets, and applications to enhance their teaching in the classroom. Traditional teaching methods may no longer fully meet the learning needs of students in this era of digital natives or gamers. Digital learning is learning facilitated by technology that gives students some element of control over time, place, path and/or pace (Florida Virtual School, 2024). In other words, digital learning is not constrained by time and space, and it has the potential to capture attention, increase learning motivation, and improve problem-solving skills more effectively than traditional teaching methods (Chuang & Chen, 2009).

The Second Language Acquisition field has been significantly impacted by a greater emphasis on individualized learning and rapid developments in artificial intelligence (AI). Increasingly adaptive language learning tools are being developed with the application of AI to the Computer Assisted Language Learning field (Woo & Choi, 2021). Digital learning has emerged as a new approach to teaching and learning. It allows teachers to transcend time and space constraints and engages students in more interactive and personalized learning experiences. This shift in learning style not only promotes active participation and collaboration but also ensures that educators and researchers are fully engaged and involved in the learning process. It provides access to a wide range of learning resources and tools, better catering to the diverse needs of students and helping teachers deliver more effective instruction (Rosenberg, 2001). Digital learning involves using digital tools and resources to combine online and in-person learning strategies and teaching activities. It encompasses various methods such as online learning, action learning, and computer-aided teaching, all of which aim to facilitate students' exploration, interaction, and extension of learning using digital resources. Students generally have a positive attitude towards digital learning, as mobile devices, while often used for entertainment, also offer convenience, speed, and ease of access for learning purposes. Additionally, digital learning can increase student participation and motivation, foster knowledge creation, aid in language learning, encourage collaboration, promote global awareness, and effectively manage time (Kee & Samsudin, 2014; Lahiri & Moseley, 2012).

In their work, Huffaker and Calvert (2003) underscore the transformative potential of digital learning. It leverages network technology to enable the seamless exchange of information across time and space, a stark contrast to the limitations of traditional classrooms. This transformative potential should not just intrigue, but inspire and motivate educators and researchers to delve deeper into the possibilities of digital learning. Through digital learning, educators and learners can engage synchronously or asynchronously in a virtual environment. For example, they can utilize platforms like Google Meet or Cisco Webex to participate in live online sessions from the comfort of their homes. Additionally, educators can create and share instructional videos, upload teaching materials, assign tasks on digital learning

platforms, and allow students to access and review learning materials before or after scheduled classes or anytime from their homes.

Rosenberg (2001) noted that digital learning is reusable and expandable without limitations on time and space and allows many individuals to participate in learning through the same platform, which was previously only possible in physical classrooms with limited seating capacity. This expansion can now cater to hundreds or even tens of thousands of learners, promoting the widespread dissemination of information and knowledge on a global scale. Teachers can utilize various teaching apps like Quizlet, Kahoot!, and Quizizz to engage students in fun and competitive learning activities and conduct formative assessments to monitor the student's progress. For instance, they can use Quizlet to create flashcards for vocabulary practice, Kahoot! for interactive quizzes, and Quizizz for self-paced review sessions. Additionally, apps like Padlet, Nearpod, and LoiLoNote School can facilitate real-time, interactive, and shared learning experiences. For example, Padlet can be used for collaborative brainstorming, Nearpod for interactive presentations, and LoiLoNote School for digital note-taking, enabling students to explore diverse ideas and responses.

Digital learning can be applied to various subjects, including English reading comprehension. It requires an active and interactive exchange between the reader and the text and involves the reader inferring or interpreting metaphors (Goodman, 1996). Day and Bamford (1998) proposed that English reading comprehension is the process of the reader constructing the meaning of the written message using prior background knowledge and linked information. At the same time, it emphasizes the importance of correct and automatic word recognition, with many sight words serving as prerequisites for constructing meaning and making high-level inferences. English reading comprehension is the interaction between the reader and the text (Aebersold & Field, 1997). When reading different types of writing, one activates appropriate mental models to aid comprehension and utilize various strategies to determine what should be remembered and what can be disregarded. For instance, when seeking information from a manual, one quickly looks for critical details such as names, locations, and timing (Brown, 2014). Studies have shown that using digital learning to teach English can significantly enhance students' reading comprehension, especially for word recognition, clear information, and contextual referential skills (Priyanka et al., 2019). This positive impact on students' English reading comprehension should instill optimism about the potential of digital learning. Additionally, students can use iPads to create concept maps, record audio and video, make comics, explain what they have learned, and express their ideas (Moon et al., 2017).

SRL is a crucial skill that students need in today's fast-paced and information-rich society. It is essential for lifelong learning. SRL involves actively setting learning goals, monitoring and controlling cognition, motivation, and behavior in line with those goals and the learning environment, using mental abilities to regulate learning behaviors, and systematically guiding oneself to translate mental abilities into academic performance. After completing a learning task, individuals should be able to reflect on their performance and use that introspection to better prepare for future learning tasks (Pintrich, 2000). SRL follows a three-phase cycle

model: the forethought phase, the performance phase, and the self-reflection phase. The forethought phase focuses on motivation, belief, and task analysis, which are essential for effective learning. During the performance phase, self-control and self-observation play vital roles. The self-reflection phase involves self-judgment and self-reaction. Learners must establish goals and methods based on their motivational beliefs, employ cognitive strategies to self-monitor, engage with others and the environment, evaluate their learning outcomes, and make necessary adjustments (Zimmerman, 2002).

One of the educators involved in this research was an English teacher at a junior high school. He observed that his students needed more intrinsic motivation and clear objectives for learning English. Additionally, they struggled with effective learning strategies and seldom utilized online resources to independently enhance their English language skills after class. As a result, the researcher decided to integrate a digital learning platform into the English teaching curriculum and then assessed its impact on the students. The study posed two specific research questions: 1) How does incorporating digital learning tools into English language instruction influence students' English reading comprehension abilities? 2) How does incorporating digital learning tools into English language instruction impact students' SRL capacities?

2. Methodology

This study used action research. Through this methodology, researchers apply digital learning to English language teaching in a continuous cycle of planning, action, observation, and reflection. The aim is to improve teaching and enhance students' self-adjusted learning and English reading comprehension skills. The study's unwavering focus on data collection and analysis is a testament to its deep commitment to understanding and fostering positive changes in students' learning strategies and reading comprehension skills, providing reassurance of its thoroughness and dedication

2.1 Program participants

This study's participants were 8th-grade students, a group with unique challenges and potential. Among the 23 students, 13 were boys, and 10 were girls. A significant portion of these students, two-thirds, rarely took the initiative to read extracurricular English books or English learning magazines. They also needed help with English reading comprehension and could not use computers or mobile phones for English learning. This study aimed to address these challenges and unlock their potential through digital learning.

2.2 Program design and implementation

The unit design is based on the content of the textbooks selected by the school, and the digital teaching platform and digital teaching tools are applied to the course teaching. The teaching process also cultivates students' self-adjustment learning ability through self-study, intra-group co-learning, inter-group learning, and teacher guidance. Students can use digital tools and platforms to write self-adjusted worksheets to learn English after class and practice using self-adjusted learning strategies for digital learning. This program was implemented for

twelve weeks. Each unit lasted three weeks. Digital learning is a critical strategy in addressing the participants' challenges, instilling confidence in the effectiveness of this approach.

This study adopted a pseudo-experimental design, as shown in Table 1.

Table 1. Experimental design

Group	Pre-test	Treatment	Post-test
experimental	O_1	X	O_3
control	O_2		O_4

In this study, the dependent variables were critical thinking, communication, creativity, and collaboration capabilities, and the independent variable was the teaching method. Therefore, the pedagogy was the significant difference between the experimental and control groups. The researchers used the following strategies to control interfering variables: (1) The experimental and control groups were from the same school and comprised students of the same grade with similar SES and life experiences. The number and gender distributions were also similar. (2) A homogeneity test conducted before the experiment showed that the two groups of students had similar 4C capabilities. (3) The same instructor taught the experimental and control groups to avoid any influence from the instructor's academic background or personal characteristics. (4) The same teaching units and teaching times were used for the two groups. (5) Pre-tests and post-tests of the two groups were administered in the same week. The instructor adopted the same testing procedures and guidelines to ensure consistency between the two groups.

2.3 Data collection

Qualitative data collection includes various sources such as classroom conversation records, teaching reflection notes, class observation and discussion record sheets, student reading worksheets, digital course feedback sheets, interview record forms, and English self-adjusted learning after-class worksheets. Quantitative data, on the other hand, is gathered through self-adjusted learning scales and English reading comprehension tests.

3. Results

3.1 Digital learning impact students' reading comprehension

Table 2 indicated that significant differences existed among reading comprehension abilities in the dimensions of vocabulary ($t = 5.40$, $p < .001$), grammar ($t = 2.32$, $p < .05$), sentence ($t = 2.19$, $p < .05$), and overall ($t = 3.92$, $p < .01$). The result revealed that digital learning could enhance students' reading comprehension capacities.

Table 2. Results of the Paired t-test for students' reading comprehension abilities

	Pre-test		Post-test		
dimension	*M*	*SD*	*M*	*SD*	*t*
vocabulary	16.70	4.77	22.26	3.15	5.40***
grammar	11.83	3.90	13.57	1.99	2.32*
sentence	36.30	13.16	42.17	14.12	2.19*
overall	64.83	18.97	77.39	17.82	3.92**

*p<.05. **p<.01. ***p<.001

In addition to the quantitative analysis of the English reading comprehension test, the researchers also explored the impact of digital learning and self-adjusted learning strategies on students' English reading comprehension ability by analyzing qualitative data such as lesson feedback sheets, teaching reflection notes, lesson observation records, and student interviews.

Quizlet helps me learn words because it can deepen my impressions through pronunciation and pictures, and it can also help me view words many times in pairing and increase my memory. (S09 Feedback Sheet)

Reflecting on the learning effectiveness of the students AILEAD365 in the two-word tests, the average class score of the two-word tests was 90 and 93, respectively, and only four students scored less than 70 points, indicating that the students were able to recognize the meaning of the words and understand English phrases and the learning results were good. (Reflections on Teaching)

I think Quizlet is beneficial for reviewing words, and word card pairing trains my reflexes and makes me more familiar with words. (S18 Interview record)

I used Kahoot and Quizizz to practice grammar multiple-choice questions that were helpful for me to learn grammar, enhance my sense of language, speed up the answering speed, and check my absorption. (S09 Feedback Sheet)

I think my grammar has improved; using Kahoot! to do grammar problems with AILEAD365 has helped me learn the correct use of grammar and become more familiar with grammar, the advantage of Kahoot! is that it makes it more attractive to do the questions, AILEAD365 is that there is a detailed explanation of grammar after completing the questions. (S23 Interview record)

I reviewed the results of Nearpod's answers, and the students could guess the meaning of the words well. Most of the students were able to draw the answers in the text. (Reflections on Teaching)

3.2 Digital learning impact students' SRL capacities

Table 3 indicated that significant differences existed among the SRL scale in the dimensions of the forethought phase ($t = 2.14$, $p < .05$), performance phase ($t = 2.66$, $p < .05$), self-reflection phase ($t = 2.23$, $p < .05$), and overall ($t = 2.60$, $p < .05$). The result revealed that digital learning applications could enhance students' SRL capacities.

Table 3. Results of the Paired *t*-test for Students' SRL capacities

	Pre-test		Post-test		
phase	*M*	*SD*	*M*	*SD*	*t*
forethought	3.79	0.99	4.20	0.72	2.14*
performance	3.09	1.16	3.72	0.93	2.66*
self-reflection	3.56	1.09	4.04	0.90	2.23*
overall	3.48	1.08	3.99	0.85	2.60*

*$p<.05$.

This study was comprehensive, incorporating both quantitative and qualitative data to analyze the impact of digital learning on students' SRL abilities. The observations revealed that students, particularly in the forethought phase, demonstrated a range of self-regulated learning strategies. They meticulously planned their English reading sessions, allocated time for post-class review, and judiciously selected digital tools and platforms for learning. Furthermore, they set specific goals for their learning sessions, including time management, speed, correctness, and performance.

I set an English reading week plan and try to make sure that time slot is set aside to read English (S13 SRL Worksheet 20230428)

I arrange the review content after English class and use digital tools such as videos, Quizlet, AILEAD365 (S23 SRL Worksheet 20230428)

I often used Kahoot to solve English learning problems (S07 Feedback Sheet 20230509)

Observe the students watching the video animation for self-study; the students will watch the animation twice and read it aloud, and some students even watch it three times, indicating that they have learned to set their own goals to watch the video several times and read the text as needed. (Observation Record 20230506)

Most of the students could hand in the class assignments within the scheduled time, which shows that the students set a goal to complete the answers within the time limit. (Teaching Reflection Daily 20230426)

Before learning English, I encouraged myself to do my best and make a learning plan. I also used AILEAD365 as a tool to review the grammar. (S20 Interview Record 20230509)

I often used the Quizlet to memorize words, such as listening to the pronunciation and practicing more. (S18 interview record 20230509)

In conclusion, the researchers integrating digital learning and SRL strategies into English teaching significantly improved students' learning outcomes. Students demonstrated the ability to set goals, devise strategies, and manage their time effectively. They utilized digital platforms and tools such as Quizlet, Cool English, Kahoot, Quizizz, and AILEAD365 to practice one-word grammar questions and set goals for answering time, speed, correctness,

and performance so that students' abilities to memorize words, learn grammar effectively, and prepare for English learning.

4. Discussion

The first finding is significant differences among reading comprehension abilities in vocabulary, grammar, sentences, and overall dimensions. The results revealed that digital learning could enhance students' reading comprehension capacities. Based on the quality analysis, after the researchers applied digital learning and self-adjustment learning strategies to English teaching, students' English reading comprehension ability improved in three aspects: word comprehension, grammatical structure, and text structure, and students were more able to identify the meaning of single words and point out the words or phrases in suitable sentences. Acquire correct grammatical usage and concepts and point out correct grammar in sentences; Read passages more fluently and have more ability to read reading strategies such as the text's general idea, details, inference, and structure. The researchers used three digital tools, Quizlet, Kahoot!, and Quizizz, to help students learn English. Students are familiar with words' sounds, shapes, and meanings through Quizlet's flashcards and matching games. Through the real-time feedback system of Kahoot! and Quizizz games, students can review grammar concepts and select appropriate grammar while practicing grammar. In addition, researchers also use pictures, sounds, videos, animations, interactive questions, etc., to help students understand the content of the text, speculate the meaning of words in the context, and extract text information so that students' English reading comprehension skills have improved.

The second finding is that significant differences existed among the SRL scale in the dimensions of the forethought phase, performance phase, self-reflection phase, and overall. The result revealed that digital learning applications could enhance students' SRL capacities. Based on the quality analysis, After the researchers applied digital learning and self-adjusted learning strategies to English teaching, students improved their self-adjusted learning ability at three levels. In the anticipation stage, students will set goals and formulate strategies. In the presentation stage, students will self-control and self-observe the state of learning, and in the self-reflection stage, students will self-reflect on the process of learning English and adjust how they learn English, which may be because the researchers used self-adjusted worksheets after class to allow students to practice planning their weekly English reading plans and selecting appropriate digital platforms and tools to help students revise, thereby improving students' ability to set their own goals and formulate strategies. In class, the researchers also asked students to read the text aloud along with the video, guided students to use an online dictionary to look up words, and taught students different learning strategies. The self-adjustment worksheet after class will also require students to record what they do not understand and concepts and words that they are not familiar with to enhance students' self-control and observation skills.

Moreover, after completing the problems with Kahoot! and Quizizz, students will not only reflect on their competition results but also discuss and review the wrong questions. After

students used Padlet to form sentences and LoiLoNote School to answer questions, the researchers also reviewed students' excellent and wrong sentences so that students could reflect on their answers. In the self-adjustment worksheet after class, the researcher asked students to reflect on their difficulties and strategies for improvement, evaluate their time management and learning status, and record their achievements to enhance their self-evaluation and self-reflection skills.

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