Student Beliefs and Preferences for ESL Reading and Writing Modalities

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Over the past decade, various factors, such as technological advancements and the pandemic, have accelerated the integration of technology in the classroom. While digital methods offer convenience and can enhance the student experience, they also raise concerns regarding increased screen time and reliance on digital tools. Also, current research suggests that the analogue modality leads to deeper learning (MacArthur, 2024). This study examines student preferences for digital versus analogue reading and writing, aiming to understand how each modality influences learning. In Spring 2024, a survey was conducted with 49 students in a university-level reading and writing course. The survey explored student views on the two modalities, while also examining preferences for using digital or analogue formats in classroom activities. The results reveal that while students believe analogue formats better support learning, digital methods are popular for class activities, highlighting the complex relationship between student preferences for learning and classroom practices.

過去10年間、技術の進歩やパンデミックなど様々な要因によって、教室におけるテクノロジーの統合が加速してきた。デジタル方式は利便性を提供し、学習者の経験を向上させることができる反面、スクリーンタイムの増加やデジタルツールへの依存に関する懸念も生じている。また、現在の研究では、アナログの様式がより深い学びにつながることが示唆されている（MacArthur, 2024）。本研究では、デジタルとアナログの読み書きに対する学習者の嗜好を調査し、それぞれの様式が学習にどのような影響を与えるかを理解することを目的とする。2024年春、大学レベルのリーディングとライティングのコースの学生49人を対象に調査を行った。この調査では、教室での活動においてデジタル形式とアナログ形式のどちらを使用するかという嗜好について調査し、2つのモダリティに関する学生の見解を探った。その結果、学生はアナログ形式の方が学習を支援できると考えている一方で、授業活動ではデジタル方式が人気であることが明らかになり、学習に対する学生の嗜好と授業実践の間の複雑な関係が浮き彫りになった。

This study was conceived in 2023. Between 2018 and 2023, although I continued teaching at universities, I did not teach a dedicated reading and writing course. During this time, educational practices changed significantly due to the Covid-19 pandemic. In 2018, instruction relied predominantly on textbooks and paper materials. By 2024, however, digital learning advancements had normalised device use in the classroom, making technological integration central in many classrooms.

During my hiatus from teaching university-level reading and writing courses, I continued teaching other subjects, often incorporating digital tools. This experience highlighted several advantages of digitally integrated instruction. For example, collaborative digital writing on shared Google Docs appeared to motivate students and build cooperative skills. LMS-based discussion forums enabled whole-class communication and idea sharing. Also, research skills were developed effectively on a computer. For teachers, digital tools offered practical conveniences, such as reducing photocopying and allowing last-minute changes to materials.

However, there seems to be a profound difference between the analogue classroom of 2018 and today's digitally integrated reading and writing classes. While digital tools offer greater flexibility and convenience, they also pose challenges.

First, while digital writing often results in more polished writing, compositions sometimes seem beyond student proficiency, which raises concerns about reliance on translation tools or generative AI. Second, distractions have increased: in 2018, the primary concern was mobile phone use, but with computers now commonplace, multi-tasking and off-task use of devices has multiplied. Finally, plagiarism is increasingly prevalent, as advances in translation software and generative AI have made it easier for students to produce work that is not their own.

Considering these issues, the integration of technology into these classes proved more complex than expected. Informal discussions and surveys revealed that while some students stated a preference for digital learning, others favoured analogue, and some

seemed to dislike digital methods entirely. It became apparent that my own technology use was largely pandemic-driven, without much student input and without clear guiding principles. Therefore, it seemed that a more thorough investigation into student preferences would be valuable.

Two research questions were written:

RQ1. Between digital and analogue learning, which do students believe is the better modality for learning to read and write in English?

RQ2. Which modality do students prefer to use in reading and writing classes, and for homework?

Literature Review

Research on reading and writing is diverse and context-dependent, with outcomes influenced by factors like student purpose and proficiency. The widespread use of digital tools in education complicates this further, as studies often focus on specific apps or methods, making broad generalizations difficult. However, common themes are emerging as more research is published.

Reading

Reading research consistently identifies the screen inferiority effect, in which analogue reading outperforms digital reading in terms of comprehension (Hakemulder & Mangen, 2024). This is thought to result from rapid scrolling and superficial engagement with text, leading to shallower comprehension (Delgado et.al.,2020). However, its relevance to ESL reading is unclear: some studies suggest digital reading can enhance understanding, while others find no significant difference (Al-Segahayer, 2024). Other research suggests that deliberate strategies, such as annotation, can mitigate the effect (Stiegler-Balfour et al., 2023). Therefore, given that ESL instruction usually emphasises such strategies, the effect could be less pronounced in this context.

Eye-tracking studies indicate that print reading encourages more careful and selective rereading compared to digital formats, which tend to promote scanning. However, it has also been found that dedicated digital reading tools, such as e-readers (Jian, 2022), and digital tablets (Ballenghein et al., 2020), can closely mimic print reading patterns in terms of fixation duration and regression behaviour. According to the embodied reading hypothesis, the fixed posture and relative lack of physical engagement could lead to a shallower comprehension when reading on computers (Hillesund et al., 2022). On the other hand, while tactile, smartphones' small screens tend to lead to an even shallower comprehension than computers (Cotton et al., 2023).

Digital equity is also a significant issue in digital education. For example, in Japan, differences in digital access and skills have been observed both between higher- and lower-ranking universities, as well as between private and public institutions, with public university students generally having better access than those at private universities (Gougeon & Cross, 2021).

Despite these challenges, digital reading has become the dominant reading modality in higher education, which illustrates a paradox: while students frequently say that analogue reading is more effective for learning, they simultaneously report preference for digital reading due to convenience, lower cost, the ease of accessing articles online, and the fact that many institutions now require it (Mizrachi, 2014; Hargreaves, 2022; Kurata et al., 2017).

Writing

Research comparing analogue and digital writing is less extensive, but neuroscience studies consistently show that handwriting activates brain regions associated with memory and deeper learning (Van der Weel & Van der Meer, 2024; Umejima et al., 2021). It is also suggested that digital tools, particularly Large Language Models (LLMs), can impair cognitive performance (Kosmyna et al., 2025). Such findings are particularly relevant to L2 writing, where digital tools might be enabling students to perform above their cognitive ability while bypassing deeper learning processes.

At the same time, digital writing offers advantages in efficiency and output quality. Word processors and digital tools facilitate higher-order revisions, support idea generation, and enable access to resources such as proof-readers and translators, all of which can enhance L2 writing performance (Ramamuthie & Aziz, 2022; Al-Wasy, 2020; Li, 2006). LLMs are believed to have significant potential to enhance student writing by providing real-time feedback, supporting idea generation, and scaffolding revision processes (Liu et al., 2024). However, as with ESL digital writing in general, reported positive outcomes seem to focus on 'performance' or an enhanced finished product, while less is said about language acquisition and positive cognitive development outcomes (Lo et al., 2024).

Research Methodology

This study employed a survey with quantitative and qualitative questions to explore Japanese ESL students' perceptions of digital and analogue learning modalities in reading and writing classes. Participants were first-year undergraduates who completed the survey in July 2024, near the end of their first semester. 49 students responded, all placed in proficiency-based groupings equivalent to B1 or B2 on the CEFR scale.

All participants were nearing completion of the university's mandatory freshman reading and writing course, a foundational course which covers a range of target skills. Instructors have flexibility in course design and textbook use but are required to ensure students meet required milestones and cover the key skills outlined in the syllabus.

The syllabus aims to build proficiency by targeting both strategic and practical skills. In reading, students improve their reading rate and comprehension, build fluency and vocabulary through graded readers, and raise awareness of discourse genres. In writing, students learn to compose different types of essays in order to develop written communication, with an emphasis on strategic writing skills and genre awareness. The final summative assessment in an essay, with B1 students writing a three-paragraph opinion essay and B2 students composing a five-paragraph compare and contrast essay.

Approaches to digital integration vary: some educators favour digital workflows, while others have returned to analogue methods, particularly in response to the rise of LLMs. However, it appears that many have adopted a hybrid approach, especially in writing, where students engage with both modalities. However, all classes require some computer use. For example, students are required to develop proficiency in word processing software, and there is an extensive reading requirement, supported by an online repository of Macmillan graded readers.

It should be noted, however, that the survey did not collect data on specific approaches or materials used by individual instructors. Consequently, details about how technology was integrated in each class are unavailable, and findings should be interpreted as reflecting general student attitudes towards digital learning, rather than the impact of particular methods.

The survey included three components:

1. Direct Questions: Students were asked to indicate which modality they believed to be better for learning to read and write in English, as well as their preferred modality for in-class and homework activities. Both questions also contained a no preference option. These results were tallied to find the outright preference for each question.
2. Open-Ended Comments: Students were prompted to explain their answers to the direct questions, to gain qualitative insights into their preferences.
3. Likert Scale Questions: A 5-point Likert scale was used to measure students' perceptions of various aspects of the topic, such as information retention and efficiency. These questions were mainly based on previous background reading or observations in my classes. The full list of survey questions can be found in Appendix A.

The survey was administered using Google Forms, with questions translated into Japanese, and students allowed to make comments in English or Japanese. Student data consent was sought prior to the survey. They were informed that their personal information would be kept anonymous and that they had the right to withdraw their data from the study at any time.

Results

Two sets of direct questions form the basis of the analysis:

Set One: Beliefs About Effective Modalities for Learning

i. Which modality is better for learning to read in English?

ii. Which modality is better for learning to write in English?

This first set asked students to indicate which modality, digital or analogue, they believe is more effective for learning to read and write in English. This corresponds to the first research question, which explores students' beliefs about the relative effectiveness of these modalities for skill development

Set Two: Preferences for Modality Use in Coursework

iii. Which do you prefer to use for reading in class and for homework?

iv. Which do you prefer to use for writing in class and for homework?

The second set of questions asked which modality students prefer to use when completing reading and writing tasks in class and for homework. This aligns with the second research question, which investigates student's practical preferences for digital or analogue methods in coursework.

In the following sections, the most common answers for each question will be discussed, using the open-ended comments and the quantitative questions to provide reasoning for the result.

Results for Learning to Read in English

The following tables present the results from the survey regarding student perceptions of digital versus analogue modalities for learning to read in English.

Table 1

Results for 'Which Do You Think is More Effective for Learning How to Read in English?'

Modality	Frequency	Percentage
Analogue	29	60%
Digital	5	10%
No Preference	15	30%

Table 2

Quantitative Survey Question Results Favouring Analogue Reading for Learning

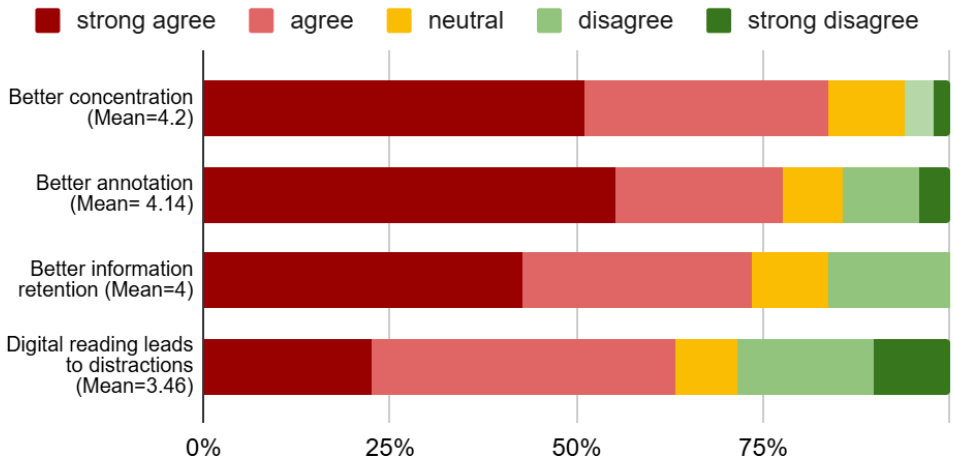

Table 3

Student Comments on Learning to Read Using the Analogue Modality

Factor	Comments
Concentration (12 mentions)	"I think I can concentrate better when I am reading on paper."
	"I often have difficulty to read text on screen. I feel that it requires strong concentration."
* Screen-related discomfort (6 mentions)	"Digital media is tiring for the eyes, so paper is better."
Annotation (6 mentions)	"I can draw a line under the words or sentences ... That is necessary to make easy to understand."

First of all, there is a strong belief that analogue reading is better for learning. Approximately 60% of the respondents express this preference, while only 10% favour digital reading. A significant portion, 30%, indicated no preference.

Relevant Likert Scale results show students strongly agree that paper-based reading provides better concentration than digital. Related to this, students agree that digital reading can lead to distractions from other media, for example, SNS. These findings are supported by the student comments, with 12 students stating concentration as the main reason for their belief. There is a related overlapping theme, with some students saying that it is difficult to focus on digital reading because reading on a screen can result in discomfort, mainly eyestrain. Overall, the theme of better concentration seems to be the outstanding reason why these students believe analogue reading is better for learning. Students also strongly agree that they retain more of what they read on paper.

Six students say that annotation is better done on paper. While there is some consensus in the literature that annotation is better done by hand (e.g. Umejima et al, 2021), it might also show a lack of proficiency or experience in handling digital texts, particularly digital annotation.

Results for Learning to Write in English

The following tables present the results from the survey regarding student perceptions of digital versus analogue modalities for learning to write in English.

Table 4

Results for 'Which Do You Think is More Effective for Learning How to Write in English?'

Modality	Frequency	Percentage
Analogue	29	60%
Digital	9	22%
No Preference	11	18%

Table 5

Quantitative Survey Question Results Favouring Analogue Writing for Learning

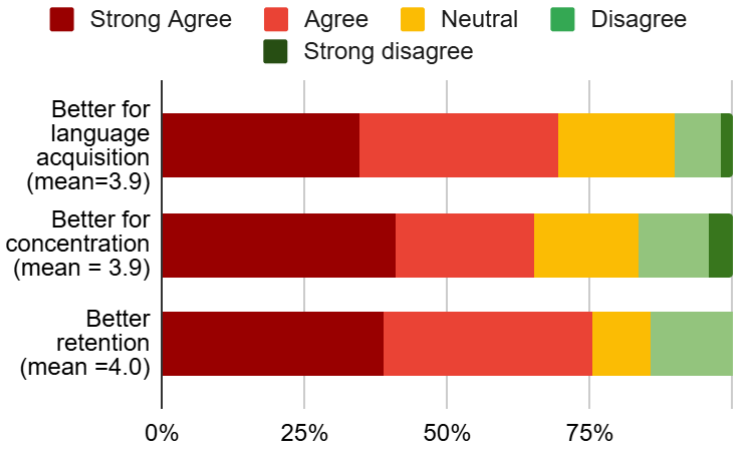

Table 6

Student Comments on Learning to Write Using the Analogue Modality

Factor	Comments
Trial and Error/Mistakes are Required to Learn (15 comments)	"If we use digital devices, we tend to depend on their tools." "With digital, the computer automatically corrects mistakes, so it's not a learning experience."
Kinaesthetic Learning (5 comments)	"I think that writing it down with my own hands will help me understand it better." "Analogue writing requires more effort .....that makes it easier to remember."

Again, students show a strong belief that analogue modalities are better for learning, this time for learning how to write in English. Again, the gap was significant, with 60% saying analogue writing is better, and only 22% saying digital writing is better for learning. As in the 'learning to read' category, the quantitative results show the belief that analogue writing improves concentration. There is also strong agreement that it is better for learning grammar and vocabulary, and better for memorisation in general.

The emergent themes in the comments are striking: 15 students say that they need some kind of trial and error to learn, they need to make mistakes, and that this is better provided when writing by hand. What is more, five students explicitly state that the tools used to enhance digital writing, such as translators, error correction, and predictive text, in fact impede the learning process when students cannot learn from their own mistakes.

Elsewhere, comments also brought up a theme of kinaesthetic learning, with five students saying that using your hands to write benefits learning. This echoes the neuroscience research mentioned in the literature review, and the current belief that writing by hand is better for cognitive processes involving memory.

Results for Classwork Preferences for Reading

The following tables present the results from the survey regarding student preferences towards digital versus analogue modalities for reading in the class.

Table 7

Student Preferences for In-Class and Homework Reading Assignments

Modality	Frequency	Percentage
Analogue	23	47%
Digital	17	35%
No Preference	9	18%

The students show a preference for the analogue modality when it comes to reading in class and at home. However, the gap is much less significant compared to their learning beliefs, with only six more students saying they prefer to read on paper. The reasons given for the reading preference were mostly the same as for the beliefs about learning to read, with students saying analogue reading offers better focus and annotation. However, the close margin suggests that digital reading holds significant appeal for these students. In order to explore this aspect, the following section analyses the appeal of digital reading in class.

Table 8

Quantitative Survey Question Results Favouring Digital Reading for Classwork

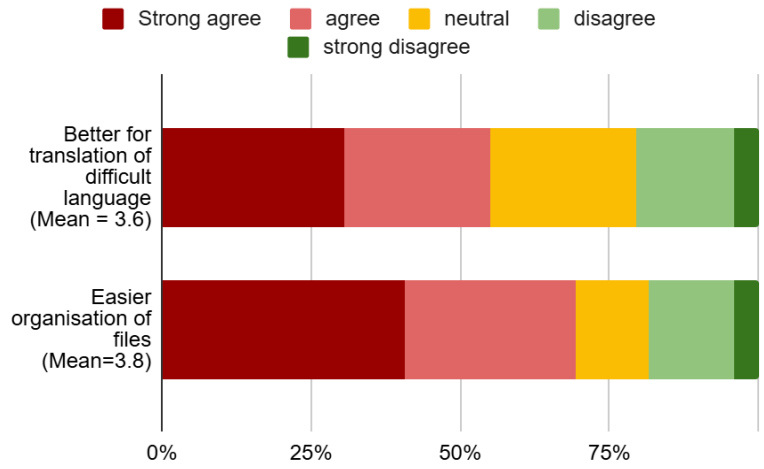

Table 9

Student Comments on Preference for Digital Reading

Factor	Comments
Portability (10 mentions)	"...I can read on the train on my way to school."
	"I like to read on paper, but I think digital is easier to use because I don't have to carry it around."
	".... it's harder to lose my homework."

The Likert Scale questions show students agree that a benefit of digital reading is the easy translation of difficult words and sentences, and that digital files are more easily organised. However, the main theme in the comments is the portability of digital texts. Students appreciate that digital texts can be read anywhere, do not require carrying books around, and are more difficult to lose or forget.

Results of Classwork Preferences for Writing

The following tables present the results from the survey regarding students' preferences towards digital versus analogue modalities for writing in the class.

Table 10

Student Preferences for In-Class and Homework Writing Assignments

Modality	Frequency	Percentage
Digital	25	50%
Analogue	12	25%
No Preference	12	25%

Table 11

Quantitative Survey Question Results Favouring Digital Writing for Classwork

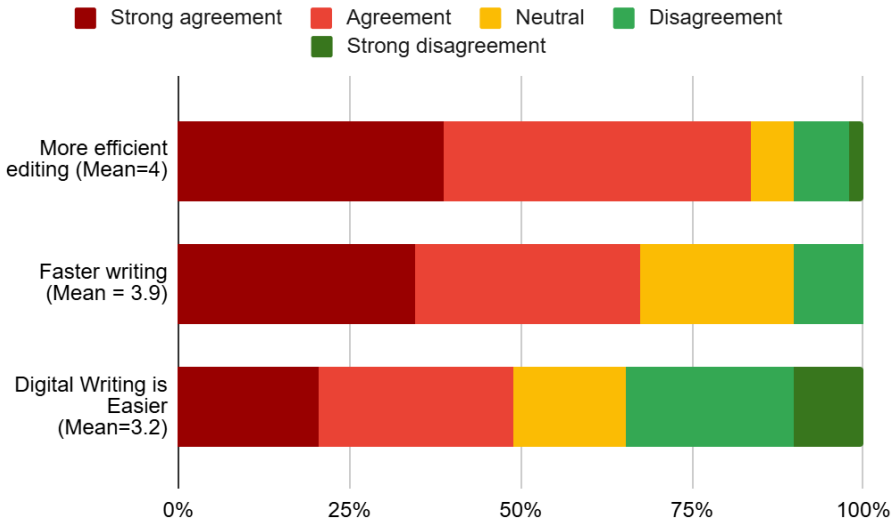

Table 12

Student Comments on Preference for Digital Writing

Factor	Comments
Speed (5 comments)	"When you're in a race against time, you want to be able to create assignments quickly digitally"
Portability (5 comments)	"You can submit it at home.
Editing (5 comments)	"It's convenient because you can easily edit it when writing long pieces of text "

A majority of students (50%) say they prefer digital writing for class and homework activities, with analogue only accounting for 25%. This is a notable turnaround from the 'learning to write' category, where 60% stated they believe analogue writing is superior.

The quantitative question results show students strongly agree that digital writing allows for efficient editing, and that they are able to write more quickly than by hand. There was also slight agreement that digital writing is easier overall.

These results are supported in the comments, most of which could be roughly bracketed under the umbrella term of convenience or practicalities. As with reading, some students prefer the portability of digital writing. They appreciate being able to complete assignments anywhere and submit them from anywhere. Others value being able to complete assignments more quickly in the digital mode, with some specifically saying that when busy, digital assignments are preferred. Related to this, some students say that digital editing is more efficient, with one student pointing out the convenience of this when it comes to writing longer assignments. Overall, it seems that the conveniences afforded by digital writing are popular with these students.

Discussion

Overall, the results of the survey echo the paradox discussed in current literature (eg, Hargreaves, 2022): while students consistently state that analogue learning is superior, they seem to prefer digital modalities in practice.

A strong majority believe that analogue reading better supports learning, mainly due to improved concentration. Students explain that reading on paper provides more focus, fewer distractions and less physical discomfort. These factors also help explain why most students prefer analogue reading in their workflow. This aligns with research linking print reading to sustained attention and deeper processing, and more broadly suggests students might be struggling to engage with digital text.

However, the preference for analogue reading in class was less decisive, with only a narrow margin over digital. Students highlight the practicalities of digital reading, particularly accessing texts anywhere and organising materials easily. These factors potentially increase chances to study, and perhaps increase exposure to English. Moreover, as students advance and require broader reading materials, digital reading will become increasingly important.

These findings suggest that both modalities offer distinct advantages, but careful planning is necessary to leverage their potential benefits. First, since digital reading is less familiar and poses challenges to students, training is essential. Strategies such as digital

annotation can help mitigate the screen inferiority effect and improve focus. Meanwhile, analogue reading's strengths in concentration and comprehension make it well-suited for intensive tasks, especially before students have gained proficiency in digital reading. Thus, one practical approach is to refine reading skills through print while gradually building digital proficiency.

The paradoxical gap between students' beliefs about effective learning and their preferences is especially clear in the writing results. While students believe that analogue writing is more effective for learning, the majority prefer digital writing. One pertinent issue raised in the study is that word processors and other tools streamline writing but can bypass trial and error, limiting engagement with errors. This could prevent students from addressing knowledge gaps, facilitating polished output without deep learning. Therefore, teachers should help students identify these gaps when using digital tools. This concern has not been explored properly in ESL research yet, but it should be viewed as critical. As digital writing becomes the norm, what are the implications for sentence-level language acquisition? The rise of LLMs intensifies this concern, as students now have tools that can simulate the entire writing process, from brainstorming to proofreading, which could undermine both language learning and cognitive development.

However, it is unsurprising that students prefer digital writing. It is faster, easier to edit, and there are numerous tools offering support. The sheer convenience of digital editing alone makes it difficult to imagine writing longer compositions by hand in any contemporary context. All of this makes L2 writing much more accessible to students, and completing assignments digitally is likely far less daunting than by hand.

Once again, there appears to be a strong case for adopting a hybrid approach that incorporates both modalities. For instance, to leverage the potential learning benefits of analogue writing, formative assignments - where students learn to write functional paragraphs or discrete language points - could be written by hand. Conversely, summative assignments could be completed on a computer, providing students with opportunities to focus on structuring arguments, developing critical thinking skills, and producing more refined work.

Limitations

This research could be strengthened by including more detail on students' past and recent digital reading and writing experiences to better contextualise the survey results. Although digital natives, these students were educated in largely analogue educational environments, which may shape their beliefs and preferences. Individual teacher approaches also influence these experiences, but this study does not examine specific pedagogies.

Second, the study was broad in scope, particularly the questions on which modality is more effective for learning to read and write in English. These questions treated the two genres monolithically, overlooking the range of sub-skills involved. Consequently, the results reflect students' general beliefs rather than providing insights into specific course skills. Future research could separate reading and writing and focus on sub-skills, such as comprehension, fluency, and language development.

Finally, the Likert scale items were limited, especially for digital writing. The survey largely overlooked the top-down, idea-level processes involved in reading and writing. This imbalance may have unfairly limited evidence supporting digital learning, which tends to facilitate top-down learning, while analogue methods perhaps better support bottom-up development.

Conclusion

The study offers several potential pedagogical insights. Despite the rise of digital learning, student beliefs cannot be overlooked, and analogue learning is still held in high regard. Since these students are still mastering the basics of the language, and much of language learning revolves around memorisation, the memory-enhancing potential of analogue learning makes it valuable for building foundational skills. However, digital reading and writing have become the dominant modality, and digital literacy skills are now essential. Thus, a principled hybrid approach could leverage the best of both:

- In-class reading: Timed, intensive paper-based reading practice to develop foundational reading skills. This is supplemented by guided digital reading practice.
- Homework reading: Online reading practice builds efficient digital reading and research skills.
- In-class writing: Pre-writing activities and drafting remain paper-based to support linguistic and cognitive development.
- Homework writing: Major assignments, like final drafts, will be completed digitally, supported by informal tasks such as LMS discussion posts to build typing skills.
- Students should receive clear guidance on, and be encouraged to reflect on, the strengths and weaknesses of each modality.

This approach balances the strengths of both modalities while addressing real-world demands. While ongoing assessment and adjustments would be necessary to ensure effectiveness, this approach provides a foundation for integrating both analogue and digital modalities to support student learning and prepare them for digital realities beyond the classroom.

Finally, this research highlights the importance of carefully integrating technology into the classroom. While ESL reading and writing benefit from technology, uncritical use can be problematic. Teachers should evaluate the necessity and appropriateness of technology, ensure it aligns with pedagogical goals and needs, and confirm it enhances the learning experience.

Bio Data

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Appendix A

Survey Questions

Preferences for English Reading

1. Reading on a screen is easier than reading on paper
   スクリーンで読むのは、紙で読むより簡単だ
2. I remember more when I write on paper
   紙に書いて読むと、より深く学べる。
3. It is easier to concentrate when reading on paper
   紙で読む方が集中しやすい。
4. It is easier to annotate when reading on paper
   紙で読む方が注釈をつけやすい。
5. I retain information better when reading on paper
   紙で読んだ方が情報を保持しやすい。
6. Reading on a screen is more convenient
   画面で読む方が便利だ。
7. When reading on a screen, I get distracted by other media (e.g. Line, YouTube, e-mail)
   画面で読んでいると、他のメディア（LINE、YouTube、メールなど）に気を取られることがある。
8. Reading on a screen allows me to quickly translate difficult words
   スクリーンで読むと、難しい単語を素早く翻訳できる。
9. Digital reading allows me to organise my files more easily
   デジタルで読むと、ファイルを整理しやすい。
10. These days, it is unnecessary to learn to read physical books
    最近では、物理的な本を読むことを学ぶ必要はない。
11. Which do you think is more effective for learning how to read in English?
    英語の読み方を学ぶには、どちらが効果的だと思いますか？
12. Please write a short comment on your answer
    あなたの答えについて、短いコメントを書いてください。
13. Which do you prefer in class/homework?
    授業や宿題ではどちらが好きですか？
14. Comment (in Japanese is ok)
    コメント（日本語でも構いません）

Preferences for English Writing

1. I prefer writing on paper than digitally
   デジタルよりも紙に書く方が好きだ。
2. It is easier to write digitally than on paper
   紙よりもデジタルで書く方が簡単である。
3. These days, it is unnecessary to learn how to write by hand
   最近では、手書きの書き方を学ぶ必要はない。
4. Writing digitally allows me to edit my work more efficiently
   デジタルで書くことで、より効率的に編集できるようになった。
5. Writing on paper is better for learning how to use grammar and vocabulary
   紙に書く方が、文法や語彙の使い方を学ぶのに良い。
6. I am more focused when writing on paper
   紙に書く方が集中できる。
7. I can write more quickly using a computer
   コンピュータを使えば、もっと速く書くことができる。
8. Digital writing is better for my English proficiency
   デジタル・ライティングの方が、私の英語力に合っている
9. Which do you think is more effective for learning how to write in English?
   英語の書き方を学ぶには、どちらが効果的だと思いますか？

10. Please write a short comment about your previous answer
    前の回答について、簡単なコメントを書いてください。
11. Which do you prefer in class/homework?
    授業や宿題ではどちらが好きですか?
12. Please write a short comment about your previous answer
    前の回答について、簡単なコメントを書いてください。