

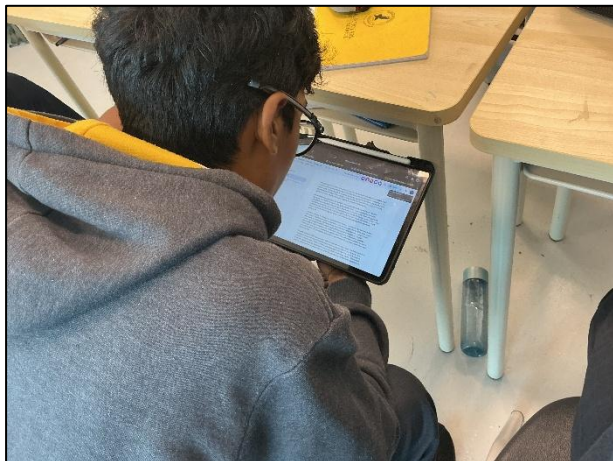


The Effects of Rapid Serial Visual Presentation (RSVP) on Reading Efficiency and Focus Among Secondary School Students



Abstract

Rapid Serial Visual Presentation (RSVP) is increasingly used in digital reading platforms to improve reading speed and maintain reader attention, yet it remains unclear whether faster reading leads to equal or better comprehension. This study investigates whether RSVP-based reading improves focus and efficiency without negatively affecting understanding compared to traditional self-paced digital reading. A total



of 45 secondary school students were assigned to either an RSVP condition using the GreyMatter platform or a traditional reading condition using Google Docs. Participants read the same passage and completed a comprehension quiz, while reading time was recorded using timers and perceived focus was

measured through a closed-ended questionnaire. The results showed that students using RSVP generally completed the reading task faster and reported slightly higher focus ratings, while comprehension scores were broadly similar between the two groups. These findings suggest that although RSVP may improve reading efficiency and perceived engagement, it does not substantially change overall comprehension outcomes.



Introduction

Digital reading has become important in modern education, with students increasingly relying on online platforms rather than printed texts. The widespread use of laptops, tablets and web-based reading tools in classrooms has changed how students interact with text and process information. Alongside this shift, technologies such as Rapid Serial Visual Presentation (RSVP) have emerged as potential tools to improve reading efficiency. RSVP presents words in a sequence at a fixed pace, reducing eye movement and limiting the ability to scan or revisit previous text. In theory, this structured presentation may help readers maintain attention and reduce distractions. However, reading comprehension is closely linked to cognitive processes such as working memory, which allows readers to temporarily store and integrate information while constructing meaning from a passage. When readers process complex sentences or unfamiliar ideas, working memory supports the ability to connect new information with previously read content, often requiring pauses or re-reading. Because RSVP restricts this flexibility, it is unclear whether increased reading speed might place greater demands on working memory and potentially affect comprehension.

To explore this question, the present study uses GreyMatter, a web-based RSVP reading platform developed by the study organizers specifically for this investigation. The GreyMatter platform presents text word-by-word at a controlled pace, allowing reading speed and engagement to be monitored digitally. Its design makes it possible to compare RSVP-based reading with a more traditional digital reading format in which students control their own pace and can freely re-read sections of the text.

The primary objective of this research is to examine whether RSVP reading through GreyMatter improves reading efficiency and attentional focus compared with traditional self-paced digital reading. In particular, the study seeks to determine whether the increased speed associated with RSVP leads to faster task completion and higher reported focus levels, while also evaluating whether these changes influence comprehension outcomes. By measuring reading time, focus ratings collected through a closed-ended questionnaire, completion rates, re-



reading behavior and comprehension quiz performance, the study aims to assess whether the structured pacing of RSVP supports or constrains the cognitive processes involved in understanding written information. Ultimately, the research seeks to determine whether speed-based digital reading tools can enhance learning efficiency without negatively affecting comprehension among secondary school students.

Review of Literature

Research on reading comprehension increasingly examines how different presentation formats influence how readers process and retain information. Studies comparing digital and print reading suggest that the medium of presentation can affect cognitive engagement and depth of understanding. For example, Mangen et al. (2013) found that students reading printed texts demonstrated stronger comprehension and recall than those reading the same material on screens, indicating that the reading format can influence information processing. However, other studies examining digital learning environments report more mixed outcomes. Quinto et al. (2022) found that while comprehension scores between printed and digital texts were broadly similar, digital platforms may still support reading performance when integrated effectively within classroom instruction.

A growing body of research has focused specifically on Rapid Serial Visual Presentation (RSVP) as an alternative method of delivering digital text. RSVP presents words sequentially at a fixed point on the screen, minimizing eye movement and allowing readers to process information rapidly. Potter (2019) explains that RSVP takes advantage of the brain's ability to recognize words quickly when they are presented in rapid succession. Early cognitive research using RSVP demonstrated that readers could process short sequences of words at high speeds under controlled conditions, suggesting that this presentation format may improve reading efficiency while maintaining attention.

Empirical studies have further explored how RSVP influences memory and reading performance in applied settings. Malik and Muhktar (2024) examined RSVP presentation parameters among young adults and found that adjusting word presentation speed and information density



significantly improved memory retention and cognitive processing efficiency. Similarly, Al-Rashidy and Hafour (2023) investigated the use of RSVP-based subtitles in an online reading environment and reported improvements in reading speed and learner motivation, although comprehension outcomes remained largely comparable across reading conditions. Together, these findings suggest that while RSVP may increase reading speed and engagement, its effects on deeper comprehension remain uncertain. The present study builds on this literature by examining RSVP-based reading through the GreyMatter platform and comparing its effects on reading efficiency, focus, and comprehension among secondary school students.

Research Objectives

1. To determine if RSVP-based reading increases students perceived focus compared to traditional self-paced reading.
2. To examine whether RSVP increases overall reading pace, leading to shorter task completion times.
3. To evaluate whether students' understanding of the extract under RSVP reading remain equal to or higher than those achieved through traditional self-paced reading.

Hypothesis

- **H⁰:** There is no significant difference in reading time between students using RSVP and those using traditional digital reading.
- **H¹:** Students using RSVP via GreyMatter will report higher focus ratings than those using traditional self-paced digital reading.



Methodology

Sample Size

A total of 45 students (19 female, 26 male) from Years 9–11 participated. Participants were divided by gender and reading method to represent gender differences in reading pace and understanding. The procedure took place in Dubai Scholars Private School, located in Dubai, UAE.

Materials

- Standardized informational passage
- GreyMatter website (RSVP format)
- Google Docs (self-paced format)
- Closed-ended questionnaire
- Comprehension assessment

Procedure

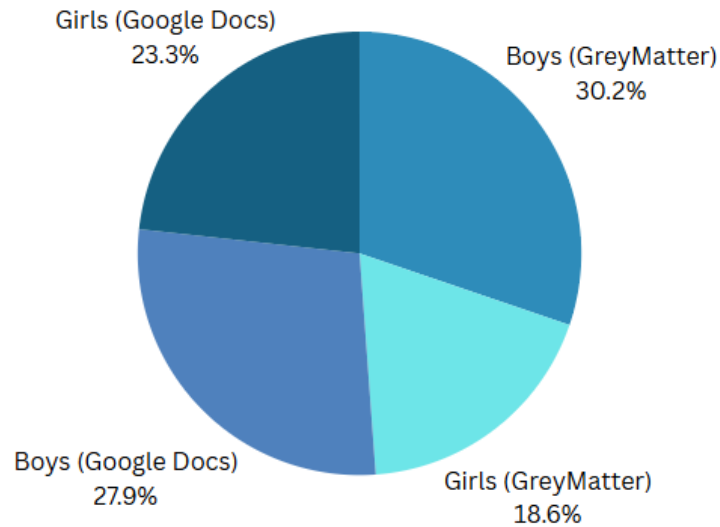
Participants were assigned to one of two reading conditions: RSVP (GreyMatter), which displayed words sequentially at a fixed pace, or Traditional Digital Reading (Google Docs), which presented the text in standard paragraph format allowing self-paced reading. 5 minutes were allotted for students to finish reading the extract, students had the choice to indicate whether they had finished the informational extract before the 5-minute mark. Following completion, students answered questions, rated perceived focus, reported re-reading behavior and pacing style, as well as indicated whether they completed the task within the time limit.





Results

Reading Method Distribution



Re-reading Behavior

	GreyMatter (RSVP)	Google Docs (Traditional)
Did not re-read	13 students (28.8%)	14 students (31.1%)
Re-read once	8 students (17.7%)	9 students (20%)
Re-read multiple times	1 student (Anomaly due to device difficulties)	0 students

Reading Pace

	GreyMatter (RSVP)	Google Docs (Traditional)
Continuous reading	12 students (26.6%)	7 students (15.5%)
Paused occasionally	6 students (13.3%)	13 students (28.8%)
Frequently paused	4 students (8.8%)	3 students (6.6%)



Completion Within Time

	GreyMatter (RSVP)	Google Docs (Traditional)
Did not finish in time	9 students (20%)	20 students (44.4%)
Finished in time	13 students (28.8%)	3 students (6.6%)



Comprehension Outcomes

Most students accurately identified scientific theories as evidence-based explanatory models, recognized scientific development as cumulative, distinguished anecdotal from empirical evidence, and selected appropriate scientific responses when predictions did not match results.

Discussion

The findings suggest that RSVP may support more structured engagement and efficient reading behavior, although comprehension still depends on flexible reading strategies. A larger proportion of students using the GreyMatter RSVP platform were able to finish the reading within the allocated time (around 28.8% of students) compared to those using Google Docs (6.6% of students), indicating that controlled pacing may help students progress through the text more quickly. Additionally, 26.6% of RSVP users read continuously without pausing, compared with 15.5% of





students using traditional digital reading, suggesting that the RSVP format may encourage sustained attention during reading tasks.

However, traditional self-paced reading allowed greater flexibility for students to pause and process information. For example, 28.8% of students using Google Docs paused occasionally, compared with 13.3% of RSVP users, which may indicate that self-paced formats support reflective processing when encountering complex material. These patterns suggest that while RSVP-based reading can enhance structured focus and reading efficiency, it may also constrain the cognitive flexibility needed for deeper comprehension. As a result, the educational use of speed-reading technologies such as RSVP should be applied strategically rather than universally, particularly when tasks require deeper analytical understanding.

Conclusion

RSVP-based reading can enhance structured focus and encourage more continuous engagement with text. However, limiting the ability to pause or revisit information may reduce the cognitive flexibility needed for deeper comprehension. Since understanding complex material often requires reflection and re-reading, rigid pacing may not always support effective learning. Therefore, RSVP shows potential as a tool for improving reading efficiency. Its educational use should be applied strategically rather than universally.

Practical Implications for the Student Body

Our case study focuses on how people read and remember in today's



world. As technology evolves, students increasingly turn to digital platforms that present information at a steady or fast pace, believing this helps them memorize better. We compare these two methods to see how reading speed affects recall and memorization. In practice, our findings can influence education,



online learning platforms and digital study tools. Self-paced reading leads to better memory, it supports using stable text formats in classrooms and necessary study material. On the other hand, if paced reading with websites like Greymatter proves more effective, it allows us to advance in the learning field. This ensures that important information is understood and remembered instead of just being read quickly.

Future Improvements

Some possible refinements could strengthen the generalizability of the current study. First, the sample size could be increased and drawn from multiple schools and diverse educational settings, allowing results to better reflect broader student populations and different cultural contexts.



Moreover, measuring long-term retention and comprehension, such as through delayed recall quizzes, would indicate whether gains in efficiency or focus are maintained beyond immediate reading tasks.

On top of that, including additional cognitive measures, such as working memory capacity or self-regulated learning strategies, could provide insight into why RSVP affects focus and comprehension, thereby linking behavioral outcomes to underlying learning processes.



Limitations

The study's findings are limited by the sample characteristics. Participants were drawn from a single school, which restricts generalizability. As a result, the outcomes may not represent students from different educational settings, cultural backgrounds, or age groups such as younger children or



adults. Broader sampling across multiple institutions would strengthen validity.

Additionally, focus was measured using a self-report rating scale, which introduces subjectivity and may reduce reliability. Students may have interpreted the scale differently or responded in

socially desirable ways. There is also the possibility of demand characteristics, as participants may have inferred the purpose of the study and adjusted their behavior accordingly, particularly when using the RSVP application. Such factors may have influenced the validity of the findings.





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