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The Effect of Brain Rot and Reading Interest on Students' Mathematical Critical Thinking: A Literature Review

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Abstract: *This study synthesizes empirical findings from studies published between 2014–2026 to identify how excessive exposure to low-quality digital content and reading interest influence students' cognitive engagement and mathematical critical thinking. The increasing exposure of students to short-form digital content has raised concerns regarding declining cognitive engagement and higher-order thinking skills, particularly in mathematics learning. This study employed a systematic literature review by analyzing peer-reviewed articles indexed in Google Scholar and Scopus published between 2014 and 2026 The review revealed that excessive consumption of fragmented digital content weakens sustained attention, cognitive engagement, and analytical reasoning, which are essential components of mathematical critical thinking. The findings indicate that excessive exposure to low-quality digital content negatively affects students' concentration, cognitive engagement, and higher-order thinking skills. In contrast, reading interest supports students' ability to analyze, evaluate, and solve mathematical problems critically. The review also shows that cognitive engagement plays an important role in linking digital behavior and mathematical critical thinking. These findings emphasize the importance of strengthening reading habits and managing digital consumption to support students' critical thinking skills in mathematics learning.*

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INTRODUCTION

The rapid development of digital technology has significantly influenced students' learning behavior, particularly in how they access and process information. One emerging phenomenon is brain rot, which refers to excessive exposure to trivial and low-quality digital content that may reduce attention span and cognitive engagement (Carr, 2010; Kirschner & De Bruyckere, 2017). According to Donaldo (2025) excessive use of digital media can alter cognitive processes and reduce individuals' ability to engage in deep thinking. Similarly, Wolf (2018) explains that digital reading habits may weaken the brain's capacity for critical and reflective thinking.

Critical thinking skills refer to the ability of individuals to regulate themselves in the process of decision-making through activities such as interpretation, analysis, evaluation, and inference. These skills are also based on consideration of evidence, concepts, methods, and contextual aspects that support the formulation of conclusions or statements (Elmawati & Juandi, 2022; Facione, 1991). Furthermore, according to Ennis (1996), critical thinking can be understood as reasonable and reflective thinking that is directed toward determining what should be believed or what actions should be taken.

In mathematics education, students are required to develop mathematical critical thinking skills, which include the ability to analyze problems, evaluate solution strategies, and draw logical conclusions (Paul & Elder, 2019). NCTM (2014) emphasizes that critical thinking is a fundamental component of mathematical proficiency. Furthermore, defines critical thinking as a purposeful and self-regulatory judgment, which is essential in solving complex problems, including those in mathematics.

However, several studies indicate that excessive digital consumption can negatively affect students' cognitive processes (Lepp et al., 2014), particularly their ability to concentrate and engage in deep thinking. (Willingham, 2017) argues that critical thinking is not a natural process and requires sustained attention and practice. When students are frequently exposed to low-quality digital content, their ability to maintain focus and engage in higher-order thinking tasks, such as mathematical problem solving, may decline.

On the other hand, reading interest is considered an important factor that supports students' cognitive development. According to Liu (2005), reading behavior significantly influences comprehension and analytical skills. Students with high reading interest tend to demonstrate better reasoning abilities and deeper understanding (Snow, 2002). In mathematics learning, critical thinking skills are essential, as students are required to understand concepts, connect various ideas, and apply knowledge in different contexts (Netriwati et al., 2026).

Despite the growing attention to digital behavior and cognitive development, there is still a research gap in understanding how brain rot and reading interest simultaneously influence students' mathematical critical thinking skills (OECD, 2019). Most previous studies have examined these variables separately, with limited focus on their combined impact in the context of mathematics education.

Therefore, this study aims to analyze the relationship between brain rot, reading interest, and students' mathematical critical thinking skills. The findings of this study are expected to contribute to the development of educational strategies that promote critical thinking and improve students' learning outcomes in mathematics.

This study does not merely combine the variables of brain rot, reading interest, and mathematical critical thinking, but seeks to provide a deeper conceptual explanation of their relationships. While previous studies have examined these variables independently or in limited combinations, this review synthesizes existing findings to identify the underlying cognitive mechanism that connects them, particularly the role of cognitive engagement. Furthermore, this study specifically focuses on the context of mathematics education, which has received relatively limited attention in prior literature. Therefore, this study offers a more structured and integrative perspective on how digital behavior and reading interest interact in shaping students' higher-order thinking skills.

METHOD

This study employs a systematic literature review approach to analyze the relationship between brain rot, reading interest, and students' mathematical critical thinking skills. A systematic review was selected to ensure a structured, transparent, and replicable process in identifying and synthesizing relevant studies.

The data were collected from reputable academic databases, including Google Scholar, Scopus-indexed journals, and international publishers, focusing on publications from 2014 to 2026 to ensure the relevance and recency of the literature. The literature selection process followed several stages:

1. Identification: Articles were identified using keywords such as brain rot, digital distraction, reading interest, and mathematical critical thinking.
2. Screening: Articles were screened based on titles and abstracts to ensure relevance to the research topic.
3. Eligibility: Full-text articles were evaluated using inclusion criteria, including:
   a. Published in peer-reviewed journals
   b. Written in English
   c. Directly discussing digital behavior, reading habits, or critical thinking in education
4. Inclusion: Selected articles were included for further analysis.

The data analysis was conducted using a thematic synthesis approach, where findings from selected studies were categorized into key themes, including: the impact of digital behavior on cognitive engagement; the role of reading interest in cognitive development; and implications for mathematical critical thinking. This process allowed the identification of patterns, relationships, and research gaps across studies.

RESULTS

In the identification stage, all articles retrieved from the selected databases were systematically screened to determine their relevance to brain deterioration, digital disruption, reading interest, and mathematical critical thinking. A total of 15 relevant studies were initially identified as potential candidates for inclusion in this review. At this stage, essential empirical information was synthesized from each study to identify key patterns and relationships among these variables.

Several studies provide strong empirical evidence indicating that the brain rot variable has a negative impact on students' critical thinking skills (Netriwati et al., 2026). Similarly, Donaldo (2025) found that the brain rot phenomenon leads to decreased concentration and reduced deep thinking ability, and encourages students to use more informal language, such as memes and slang, in communication.

The screening stage was conducted by selecting articles based on their titles, abstracts, and substantive relevance to the research objectives. Of the 15 articles identified in the initial search, 5 articles were excluded for not meeting the established relevance criteria. The excluded studies generally did not directly investigate the effect of the examined variables on students' mathematical critical thinking skills, but instead focused on health science contexts (Imaningdyah et al., 2017; Purwoko & Simanjuntak, 2022). Furthermore, several studies did not provide empirical evidence regarding the effectiveness of the intervention, as they were limited to reporting students' reading interest without evaluating its effect on the development of mathematical critical thinking skills (Abdul Aziz, 2025; Erika Setiowati et al., 2024; Heriyanto et al., 2022; Khasanah et al., 2023; Maharani et al., 2017; Ningrum & Purnama Adi, 2023). Table 1. presents a summary of selected studies, including their research focus, methodology, and key findings related to digital behavior, reading habits, and cognitive development in educational contexts.

Table 1. Summary of Previous Studies

Author	Focus	Method	Key Findings
Donaldo (2025)	Brainrot	Qualitative study	Excessive digital exposure reduces deep thinking ability
Kirschner & De Bruyckere (2017)	Digital multitasking	Literature review	Multitasking decreases concentration and learning effectiveness
Lepp et al. (2015)	Mobile phone use	Quantitative study	High phone usage negatively affects academic performance
Netriwati et al. (2026)	Reading behavior	Quantitative study	Brain rot, learning motivation, and reading interest have a significant influence on critical thinking skills.
Wikanengsih et al. (2020)	Critical reading ability mathematical critical thinking	descriptive correlational	There is a significant correlation between critical reading competency and mathematical critical thinking competency with significance value of 0.000
OECD (2019)	Digital literacy	Large-scale-study	Digital behavior impacts cognitive development and learning outcomes

Source: Processed from selected literature, 2026

Based on Table 1., several notable patterns were identified concerning the influence of digital behavior and reading interest on students' cognitive engagement and mathematical critical thinking. The findings of this study indicate that digital behavior, particularly excessive exposure to low-quality and trivial content, has a significant influence on students' cognitive engagement (Lepp et al., 2014). This phenomenon, often referred to as brain rot, is associated with a decline in attention span and a reduced ability to maintain focus on cognitively demanding tasks. Students who frequently consume short-form and less meaningful digital content tend to demonstrate lower levels of concentration (Kirschner & De Bruyckere, 2017), which directly affects their engagement in learning activities.

In the context of mathematics learning, this decline in cognitive engagement has significant implications. Students' critical reading abilities, which are essential for enhancing their mathematical critical thinking competence, require sustained attention, logical reasoning, and the capacity to process information systematically (Wikanengsih et al., 2020). However, students who are accustomed to consuming fragmented digital content may experience difficulties in maintaining focus when dealing with complex mathematical problems. As a result, their ability to analyze problem structures, identify relevant information, and apply appropriate solution strategies may be weakened.

Several previous studies have also reported similar findings, indicating that digital behavior plays a crucial role in shaping students' cognitive performance (OECD, 2019). Excessive use of digital media, particularly content that does not require deep thinking, has been linked to decreased academic engagement and reduced higher-order thinking skills. These conditions further highlight the negative impact of brain rot on students' learning processes, especially in subjects that require analytical thinking such as mathematics.

On the other hand, the findings reveal that reading interest contributes positively to students' cognitive development (Netriwati et al., 2026). Students who demonstrate a strong interest in reading tend to engage more actively in learning and exhibit better comprehension skills. Reading activities encourage students to process information more deeply, enabling them to understand concepts, evaluate ideas, and make logical connections. These cognitive processes are closely related to the development of mathematical critical thinking skills.

The findings of the study indicate that high exposure to poorly managed digital content can reduce the quality of students' cognitive engagement and reading interest function as supporting factors in the development of critical thinking skills (Netriwati et al., 2026). Students with higher reading interest are more likely to approach problems systematically and carefully, which enhances their ability to construct logical arguments and arrive at accurate conclusions. This indicates that reading interest not only supports general cognitive development but also specifically contributes to students' performance in mathematics.

Furthermore, the findings suggest that there is a contrasting relationship between digital behavior and reading interest. While excessive digital exposure tends to reduce cognitive engagement, reading activities promote deeper thinking and enhance analytical abilities. This contrast highlights the importance of balancing students' digital consumption with meaningful literacy practices to support optimal cognitive development.

Overall, the synthesis of previous studies indicates that both brain rot and reading interest are important factors influencing students' mathematical critical thinking skills. Cognitive engagement emerges as a key element that connects these variables, where negative digital behavior weakens it, and positive reading habits strengthen it. Consequently, understanding these relationships is important for designing effective educational strategies that can enhance students' higher-order thinking abilities in mathematics.

DISCUSSION

The findings of this study demonstrate that digital behavior, particularly excessive exposure to low-quality content commonly referred to as brain rot, plays a significant role in shaping students' cognitive processes. This phenomenon is closely related to reduced attention span and limited cognitive engagement, which are essential components in the learning process. Donaldo (2025) Excessive exposure to social media and screen-based activities, as revealed through qualitative analysis, The study highlights the detrimental impacts of excessive digital consumption, including limited vocabulary development, disrupted attention span, diminished interpersonal communication, and an increasing dependence on visual or meme-oriented modes of expression.

Mathematical critical thinking is not merely about obtaining correct answers, but involves a series of complex cognitive processes such as interpreting problems, analyzing relationships, evaluating possible strategies, and drawing logical conclusions. According to Wikanengsih et al. (2020), "Brain rot" a commonly used term to describe mental stagnation resulting from excessive exposure to social media and prolonged screen use. Critical thinking is an active and reflective process that demands continuous mental effort. When students are frequently exposed to low-quality digital content, their cognitive engagement tends to decline, making it more difficult for them to perform these higher-order thinking processes effectively.

Furthermore, from a cognitive psychology perspective, this phenomenon can also be explained through the concept of cognitive load. Excessive exposure to fragmented and irrelevant information may overload students' working memory, thereby reducing their capacity to process complex mathematical information. As a result, students may struggle to organize information logically and to apply appropriate problem-solving strategies in mathematics learning.

On the other hand, the findings of this study emphasize the positive contribution of reading interest in enhancing students' mathematical critical thinking skills. Reading is not only a passive activity but also an active cognitive process that involves comprehension, interpretation, and evaluation of information. Wikanengsih et al. (2020) stated that there is a positive correlation between critical reading competence and mathematical critical thinking ability, meaning that higher levels of critical reading are associated with better mathematical critical thinking skills. Therefore, it is necessary to enhance students' critical reading abilities in order to improve their mathematical critical thinking competence. Students who have a strong interest in reading are more likely to engage in deeper cognitive processing, which supports the development of reasoning and analytical skills.

In the context of mathematics education, reading plays an important role in helping students understand problem statements, identify relevant information, and construct logical arguments. Students who actively engage in reading activities tend to demonstrate better abilities in interpreting mathematical problems and evaluating different solution strategies. This supports the development of mathematical critical thinking, which is essential for solving both routine and non-routine problems.

Moreover, reading interest is closely related to the development of metacognitive skills, which enable students to monitor and regulate their own thinking processes. Students with strong reading

habits are more likely to reflect on their understanding, identify errors, and adjust their problem-solving approaches. This ability is crucial in mathematics learning, where students are required to evaluate the correctness and efficiency of their solutions.

In addition, the integration of reading activities into mathematics instruction can serve as an effective pedagogical strategy. Teachers may integrate contextual exercises, mathematical readings, and inquiry-based learning strategies to encourage students to engage more actively with mathematical concepts. Such methods can strengthen students' conceptual comprehension while also improving their analytical and critical thinking abilities.

The contrasting roles of brain rot and reading interest indicate that digital behavior and literacy practices are interconnected factors that significantly influence students' cognitive development. While excessive exposure to low-quality digital content tends to weaken cognitive engagement, reading activities promote deeper thinking and enhance analytical abilities. Therefore, it is essential for educators to create a balanced learning environment that minimizes unproductive digital exposure while encouraging meaningful reading activities.

The findings contribute to the existing body of knowledge by offering a deeper understanding of how digital behavior and reading interest interact in shaping students' mathematical critical thinking abilities. The results also have practical implications for educators, suggesting that improving students' reading habits and managing their digital consumption can be effective strategies to enhance higher-order thinking skills in mathematics.

CONCLUSION

This study concludes that digital behavior and reading interest play significant yet contrasting roles in influencing students' mathematical critical thinking skills. The phenomenon of brain rot, characterized through continuous consumption of low-quality digital media, tends to reduce students' cognitive engagement, attention span, and ability to perform higher-order thinking processes. Consequently, students may encounter challenges when interpreting and solving mathematical problems, evaluating solution strategies, and constructing logical arguments (Netriwati et al., 2026).

In contrast, reading interest demonstrates a positive contribution to the development of mathematical critical thinking (Netriwati et al., 2026). In mathematics education, critical thinking abilities play an important role because students need to comprehend concepts effectively, connect various ideas, and apply knowledge in different contexts

Furthermore, this study highlights that cognitive engagement is a key factor in supporting the development of critical thinking in mathematics. While unproductive digital exposure may weaken this engagement, meaningful reading activities can enhance it by encouraging deeper information processing and reflective thinking. Therefore, the balance between digital consumption and literacy practices becomes an important consideration in modern education.

From a practical perspective, these findings suggest that educators need to design learning environments that promote active reading habits while also guiding students in managing their use of digital media. Integrating reading-based learning strategies into mathematics instruction can serve as an effective approach to improve students' critical thinking skills.

Finally, this study recommends that future research should explore empirical approaches to further examine the relationship between digital behavior, reading interest, and mathematical critical thinking in real classroom settings. Such investigations are important to provide more comprehensive and evidence-based insights into how these variables interact in educational contexts.

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REFERENCES

Abdul Aziz, N. (2025). Pemanfaatan Teknologi Interaktif dalam Mengurangi Dampak Brain Rot pada Siswa. *Jurnal Syntax Fusion*, *5*(07), 154–162. https://doi.org/10.54543/fusion.v5i07.476

Carr, N. (2010). *The Shallows: What the Internet Is Doing to Our Brains*. W. W. Norton & Company.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.

Donaldo, K. P. (2025). Scrolling Into Stagnation: A Qualitative Study on the Perceived Effects of "Brain Rot" Among Students' Communication Skills. *PPSDP International Journal of Education*, *4*(2), 892–915. https://doi.org/10.59175/pijed.v4i2.823

Elmawati, E., & Juandi, D. (2022). Mathematical Critical Thinking Ability In Indonesia: Systematic Literature Review (SLR). *Symmetry: Pasundan Journal of Research in Mathematics Learning and Education*, *7*(2), 210–221. https://doi.org/10.23969/symmetry.v7i2.6426

Ennis, R. H. (1996). Critical Thinking Dispositions: Their Nature and Assessability. *Informal Logic*, *18*, 165–182. https://doi.org/10.22329/il.v18i2.2378

Erika Setiowati, Syamsul Hadi, Maria Ulfa, Ahmad Dainuri, Fajar Sholeh, Miftahus Surur, & Zainul Munawwir. (2024). Analisis Kemampuan Literasi Matematika Dalam Meningkatkan Kemampuan Berpikir Kritis Siswa. *Jurnal Kajian Penelitian Pendidikan Dan Kebudayaan*, *2*(2), 55–68. https://doi.org/10.59031/jkppk.v2i2.321

Facione, P. A. (1991). *Using the California Ctitical Thinking Skills Test in Research, Evaluation, and ASsessment*. CALIFORNIA ACADEMIC PRESS.

Heriyanto, Y., Besariani, K. C., Zahira, R. G., Sabina, P. E., & Pandin, G. R. (2022). *PENGARUH ETIKA DAN MORAL REMAJA TERHADAP LUNTURNYA LITERASI DI ERA DIGITAL*. OSF preprints. https://doi.org/10.31219/osf.io/gf4t3

Imaningdyah, A., Suryaatmadja, M., & Kiemas, L. S. (2017). Protein S100 sebagai Petanda Kerusakan Otak pada Cedera Otak Ringan dan Sedang S100 Protein as A Brain Injury Biomarker in Mild and Moderate Traumatic Brain Injury. *MAJALAH SAINSTEKES*, *4*(1), 21–029. https://doi.org/10.33476/ms.v4i1.899

Khasanah, U., Miyono, N., Utami, R. E., & Rachmawati, Y. (2023). Pemanfaatan Pojok Baca Dalam Menumbuhkan Minat Baca Siswa Kelas II Sekolah Dasar. *Jurnal Educatio FKIP UNMA*, *9*(2), 703–708. https://doi.org/10.31949/educatio.v9i2.4813

Kirschner, P., & De Bruyckere, P. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education*, *67*, 135–142. https://doi.org/10.1016/j.tate.2017.06.001

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and Satisfaction with Life in college students. *Computers in Human Behavior*, *31*, 343–350. https://doi.org/10.1016/j.chb.2013.10.049

Liu, Z. (2005). Reading behavior in the digital environment: Changes in reading behavior over the past ten years. *Journal of Documentation*, *61*(6), 700–712. https://doi.org/10.1108/00220410510632040

Maharani, O. D., Laksono, K., & Sukartiningsih, W. (2017). Minat Baca Anak-Anak Di Kampoeng Baca Kabupaten Jember. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan Dan Hasil Penelitian*, *3*(1), 320–328. https://doi.org/10.26740/jrpd.v3n1.p320-328

Mangen, A., Walgermo, B. R., & Brønnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International Journal of Educational Research*, *58*, 61–68. https://doi.org/10.1016/j.ijer.2012.12.002

NCTM. (2014). *Principles to Actions: Ensuring Mathematical Success for All*.

Netriwati, Wari, mentari F., Dewi, N. R., & Nendra, F. (2026). PERAN BRAIN ROT, MOTIVASI BELAJAR, DAN MINAT BACA DALAM MEMBENTUK KEMAMPUAN BERPIKIR KRITIS MATEMATIS MAHASISWA. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *11*(1), 150–159. Retrieved from https://www.journal.unpas.ac.id/index.php/pendas/article/view/41754

Ningrum, M., & Purnama Adi, F. (2023). Hubungan antara minat belajar dengan kemampuan berpikir kritis matematis peserta didik kelas V sekolah dasar. *Didaktika Dwija Indria*, (4), 31–36. https://doi.org/10.20961/ddi.v11i4.77153

OECD. (2019). *PISA 2018 results (Volume I): What students know and can do*. OECD Publishing. https://doi.org/10.1787/5f07c754-en

OECD. (2021). *21st-century readers: Developing literacy skills in a digital world Institution*.

Paul, R., & Elder, L. (2019). *Critical thinking: Tools for taking charge of your learning and your life* (4th ed.). Pearson Education.

Purwoko, L. Y. M., & Simanjuntak, P. (2022). Kombinasi Ekstrak Herba Pegagan dan Daun Kelor terhadap Kerusakan Otak dengan Metode Radial Eight-Arm Test. *Pharmaceutical Journal of Indonesia*, *19*(01), 142–150. https://doi.org/10.30595/pharmacy.v19i1.13490

Snow, C. E. (2002). *Reading for Understanding: Toward an R&D Program in Reading Comprehension*.

Snyder, H. guidelines J. J. of B. R. V. 104 P. 333–339. (2019). Literature review as a research methodology: An overview. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Wikanengsih, San Fauziya, D., & San Rizqiya, R. (2020). The correlation between students' critical reading ability and their mathematical critical thinking. *Journal of Physics: Conference Series*, *1657*(1). https://doi.org/10.1088/1742-6596/1657/1/012041

Willingham, D. T. (2017). Critical Thinking: Why Is It So Hard to Teach? *American Educator*, 8–19. https://doi.org/10.3200/AEPR.109.4.21-32

Wolf, M. (2018). *Reader, Come Home: The reading Brain in a Digital World*. Harper Collins Publisher.