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The Digital Era's Impact: Brain Rot and Literacy Crisis Among Indonesian Students

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Abstract

The phenomenon of brain rot among Indonesian students reflects a serious literacy crisis in the era of rapid and superficial digital consumption. This study examines the correlation between intense exposure to instant digital content and the decline in critical literacy skills and reading interest. Using data from PISA 2022 and theoretical frameworks such as Cognitive Load Theory, Uses and Gratification, and the concept of Digital Natives, the research explores how instant information weakens focus, working memory, and reflective thinking. Findings indicate that students' dependence on fast-paced content reduces their ability to engage deeply with complex texts. To address this, the study proposes 21st-century literacy strategies, including strengthening critical digital literacy and implementing reflective pedagogical approaches like slow reading and deep learning. The study concludes that the literacy crisis stems not only from low reading interest but also from a mismatch between educational systems and students' digital culture.

Keywords : *Brain Rot, Reading Interest*

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INTRODUCTION

The decline in students' reading interest in Indonesia is reflected in the results of the 2022 Program for International Student Assessment (PISA), which shows that the average reading literacy score of 15-year-old students in Indonesia is 359, the lowest among OECD countries, and has decreased by 12 points compared to PISA 2018 (371 points), while the OECD average is 476 points (Seitzer 2021). Nationally, the Literacy Development Index (IPLM) released by the Central Statistics Agency in 2023 stands at 68.19 on a scale of 0–100, classified as "medium", indicating that training efforts and the culture of reading among the community, including students, still need improvement. This condition underscores the urgency for further research to identify the factors causing the decline in students' reading interest and to formulate effective intervention strategies in the context of national education (Karakus 2023).

In the midst of the rapid development of information technology, teenagers have become the most active group in accessing and consuming instant digital content through various platforms such as social media, short videos, and entertainment apps. According to the We Are Social report of 2024, more than 90% of Indonesian teenagers access the internet every day, with an average device usage time of over 6 hours per day, mostly for non-academic activities. The introduction of

this instant digital content consumption impacts a fast-paced way of thinking, decreased concentration, and reduced interest in deep literacy activities such as reading books or writing. This phenomenon raises concerns about the quality of character formation, critical literacy skills, and teenagers' readiness to face future challenges that demand quality thinking and depth of analysis.

The emergence of the term brain rot in popular culture marks an increasing awareness of the negative impact of excessive exposure to fast, shallow, and purely entertainment digital content. This term is widely used on social media by teenagers and young adults to describe a condition of declining cognitive function, such as difficulty focusing, decreased memory, and loss of motivation to think deeply due to continuous consumption of instant content. This phenomenon is not merely anecdotal, but is beginning to attract attention from academics and psychologists who link it to the declining critical literacy skills and reflective capacities of the younger generation. In this context, brain rot is not just a trending term, but rather a reflection of a cognitive literacy crisis that must be taken seriously through educational approaches and healthier, sustainable digital literacy policies.

The phenomenon of the rise of educational short videos on platforms like TikTok and Instagram marks a significant change in the way the younger generation accesses information, where speed and visual appeal are prioritized over depth of content. Although this trend has positive potential in simplifying complex materials, much of the content is superficial, unverified, and lacks scientific grounding. The habit of doomscrolling or endless scrolling also exacerbates this condition, encouraging passive information consumption without critical thinking processes (Fernández 2023). As a result, hoaxes and misinformation disguised as education are increasingly easy to spread and are readily accepted by teenagers who lack adequate digital literacy skills. This situation creates a significant challenge for the Indonesian education system in developing learning strategies that are adaptive to the digital landscape without compromising the quality of literacy. Therefore, this study aims to analyze the relationship between the phenomenon of brain rot and the literacy crisis among Indonesian students, as well as to provide policy recommendations based on critical digital literacy that are relevant to the local socio-cultural context (Kartol 2025).

DISCUSSIONS

1. Literature Review

The term brain rot popularly refers to a condition in which an individual experiences a decline in thinking quality due to excessive exposure to shallow, repetitive, and meaningless digital content. In the context of internet culture, brain rot is often associated with the excessive consumption of short videos, absurd memes, or hyperactive entertainment content that offers little educational value (Bhagwath n.d.). The main characteristics of this phenomenon include decreased focus ability, weakened analytical skills, a tendency for instant thinking, and a loss of interest in deep reading or discussions. Although not included in medical terminology, brain rot has become a concern in the study of digital psychology and education due to its real impact on mental health, cognitive development, and the quality of social interactions, especially among the younger generation who intensely interact with social media.

The phenomenon of brain decay is closely correlated with the dependence on dopamine release resulting from excessive consumption of digital content. In neuropsychological studies, dopamine is known as a neurotransmitter that plays a role in the brain's reward system, where pleasurable activities or those that evoke a sense of enjoyment trigger the release of dopamine. Digital content such as short videos, social media notifications, and dare games are designed to provide instant stimuli that can continuously trigger dopamine release. When this becomes a habit, the brain becomes accustomed to instant gratification, thus reducing sensitivity to learning activities that require cognitive effort and do not provide instant rewards. In an educational context, this dependency can disrupt the process of internalizing values, concentration, and long-

term learning motivation. Learners tend to lose interest in traditional learning that requires sustained attention and deep reflection.

Brain damage significantly impacts three important aspects of cognitive processes, namely attention, working memory, and critical thinking ability. Exposure to fast and smooth digital content can lead to a decrease in meridian attention capacity, which is the individual's ability to focus on relevant information while ignoring distractions. In the long term, this habit can disrupt the functioning of short-term memory or working memory, which is the system that temporarily stores and processes information in the thinking process. When working memory is overloaded by fragmentary digital stimuli, the capacity to organize, inform, and transmit information becomes limited. As a result, the ability to think critically, which requires a deep and reflective mental process, is declining. In the context of education, this poses a serious challenge as learners become more reactive than reflective, more exposed to instant information than building a comprehensive understanding of concepts.

International and national data indicate serious challenges in the literacy quality of students relevant to the impact of brain rot. The results of the Program for International Student Assessment (PISA) released by OECD show that the reading, mathematics, and science literacy skills of Indonesian students are still below the average of member countries, with a significant downward trend in recent years (Robertson 2021). This is in line with the national Aktivitas Literasi Membaca Index (Alibaca) which also shows low reading interest and text analysis skills among students. A UNESCO report further strengthens this finding by highlighting the existence of a global learning crisis, where millions of children and adolescents are in school but do not acquire adequate basic competencies, including in reading comprehension and critical thinking (Lau 2022). This situation is further exacerbated by the dominance of fast and shallow digital content consumption, which triggers a decline in focus and a tendency towards instant thinking.

The lack of a reading culture in Indonesia and the challenges in accessing quality books are the roots of the increasingly glaring literacy gap in the digital information era. Although access to technology and the internet is expanding, this has not yet been matched by quality reading habits. Many students are accustomed to consuming visual and instant content rather than reading long texts that require analytical thinking (Thornhill-Miller 2023). On the other hand, the distribution of relevant, interesting, and contextual reading materials is still very limited, especially in remote areas. As a result, the literacy skills possessed are still unable to meet the challenges of the complexities of the digital information flow that demands critical thinking skills, media literacy, and information evaluation abilities. Learners tend to be passive in receiving information, lacking the tools to sort and analyze it critically. This gap indicates the need for a change in educational approaches, shifting from a previous focus solely on basic reading and writing skills to strengthening adaptive multidimensional literacy in line with the times.

One concrete manifestation of the impact of brain rot and low critical literacy in the digital age is the proliferation of fake 'educational' content trends on platforms like TikTok. Although many content creators claim to present scientific or educational material, a significant number of them spread invalid information, disseminate misleading information, or even completely false content to attract attention and gain high interaction. Recent studies show that TikTok's algorithms tend to prioritize viral and emotionally engaging content, rather than based on the accuracy or validity of the content. This enables the wide dissemination of pseudo-educational content that is packaged attractively but lacks scientific foundation. In the context of education, this trend is highly problematic because learners, especially adolescents, often use social media as their primary source of information without having adequate digital literacy skills and evaluation sources. As a result, false information packaged in this 'educational' narrative can shape misconceptions, intent of facts, and involve critical thinking skills.

The phenomenon of digital Fear of Missing Out (FOMO) and the prevalence of hyper-short content have shaped the information consumption landscape, creating a passive and shallow mindset among Indonesian students. FOMO drives individuals to stay connected online to avoid feeling left out from trends, gossip, or popular discourse, which ultimately traps them in an

endless scrolling cycle on social media (Jabeen et al. 2023). Platforms like TikTok and Instagram leverage algorithms and interface designs that are designed to retain users' attention for as long as possible, thus creating an addiction to instant information. In the process, the content consumed tends to be hyper-short, sensational, and lacking depth, which indirectly trains the brain to only respond to quick and superficial stimuli without encouragement to think critically or reflectively. The impact of this is that students become increasingly accustomed to passive information consumption, where understanding of an issue only scratches the surface, and they lose the ability to process, evaluate, and contextualize information comprehensively. This condition not only affects the quality of literacy but also diminishes the intellectual capacity of students to respond to knowledge challenges in a complex digital era.

Cognitive Load Theory explains that the human working memory capacity is limited, so excessive or complex information can disrupt effective learning processes (Chen, Paas, and Sweller 2023). In the context of the literacy crisis and the brain rot phenomenon among Indonesian students, this theory becomes highly relevant because excessive consumption of digital content, especially fast content and formats like short videos, can lead to cognitive overflow. When the brain is continuously exposed to instant visual and auditory stimuli, students may miss the opportunity to engage in deep processing of information, which is at the core of reading and understanding texts. This not only hampers the development of critical literacy but also decreases concentration endurance and the ability to organize knowledge systematically (Szulewski et al. 2022).

The Uses and Gratification Theory explains that individuals actively choose media and content based on specific psychological and social needs, such as entertainment, information, self-identity, and social interaction (Alam et al. 2024). In the context of Indonesian students in the digital era, this theory helps explain why they are more attracted to lightweight, short, and entertaining content like TikTok videos or YouTube Shorts rather than reading books or scientific articles. The need for instant entertainment and an escape from academic pressure makes digital content the primary choice that quickly fulfills emotional satisfaction, even though it has long-term effects on the decline in cognitive quality and reading interest. This imbalance reinforces the symptoms of brain rot, where the brain becomes accustomed to quick stimuli and loses resilience to deep cognitive processes such as reading and writing.

The concept of Digital Natives and Digital Immigrants introduced by Prensky describes the generational differences in interaction with digital technology (Agárdi and Alt 2024). The difference between digital natives and digital immigrants reflects the level of familiarity and use of digital technology among different generations. Digital natives are individuals born and raised in the digital technology era, so they are naturally accustomed to and skilled in using devices such as the internet, social media, and other digital software (Colasante et al. 2022). In contrast, digital immigrants are those who were not born in the digital era but had to actively learn and adapt to master this technology, often facing difficulties in keeping up with the pace of technological changes (Wong et al. 2022). These differences not only affect the way they communicate, learn, and work, but also impact education strategies and human resource development in the current digital era.

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2. Phenomenological and Contextual Analysis

The Manifestation of Brain Rot Among Students

The phenomenon of brain rot among Indonesian students is becoming increasingly evident through various manifestations of learning behavior that are being studied (Du et al. 2022). One of the most common symptoms is difficulty in maintaining focus for extended periods, especially when faced with lengthy readings or learning materials that require deep concentration. Many students show a tendency to get bored quickly, impatience in completing a text in its entirety, and prefer instant summaries or visual explanations like short videos (Aribowo and Bagaskara 2025). Even in formal learning processes, a significant number of students exhibit a high dependence on fast and instant digital stimuli, which affects their cognitive endurance for learning processes that require reflection and understanding of concepts. This phenomenon indicates a decline in deep literacy skills and long-term concentration, which are symptoms of the increasingly concerning brain rot phenomenon in the digital era. Dependence on instant stimulation and rapid visualization has led their brains to be less trained to process critical thinking and reflection, making the need for a balanced educational approach increasingly urgent to restore optimal cognitive abilities. This condition not only affects the declining interest in reading but also hinders the development of critical, analytical thinking, and overall academic literacy skills. If not addressed seriously, the symptoms of this brain rot have the potential to create a generation that is weak in literacy capacity, even while living amidst an abundance of information (Yousef 2025).

despite living in the midst of an abundance of information. Field findings presented by several teachers at various educational levels indicate a significant decline in students' interest in deep reading activities. Based on a limited survey conducted by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) in 2021, more than 60% of teachers stated that students are more interested in accessing social media and entertainment videos than reading textbooks or other scientific sources (Singarimbun 2023). This phenomenon is reinforced by reports from the Pusat Asesmen dan Pembelajaran (Pusmenjar), which noted that many students experience a decline in concentration during learning sessions, especially when the material presented is not packaged in a visual or interactive format. In addition, teachers also observe that students tend to avoid reading long texts and prefer quick answers from search engines without going through a deep understanding process. This data reinforces concerns that the tendency of digital natives towards instant digital consumption and rapid visualization contributes to the phenomenon of declining deep literacy skills and long-term concentration. The results of this survey and study serve as an important foundation for formulating adaptive pedagogical strategies to address these challenges and prevent cognitive degradation among students.

Digital Transformation in Education that Has Not Been Adequately Prepared

The massive digitization of education during the COVID-19 pandemic has long-term impacts on the learning patterns of Indonesian students. The sudden shift to a bold learning system without adequate infrastructure and pedagogy preparedness has created instant and fast-paced study habits. The learning process, which ideally requires focus and cognitive engagement, has been replaced by multitasking activities where students often do assignments while browsing social media or watching entertainment videos simultaneously. Students have become accustomed to quickly accessing information, switching between various digital platforms, and multitasking without enough deep reflection.

This habit has the potential to reduce their ability to perform critical analysis and maintain focus for long periods, thus hindering the development of deep literacy and higher-order thinking skills. Moreover, the unpreparedness of the education system in managing and effectively integrating technology exacerbates this situation, making the learning process more superficial and less effective in building long-term competencies. As a result, many students become accustomed to receiving information in a fragmented and superficial manner, without undergoing a thorough internalization process. The lack of readiness of the education system to instill critical

digital literacy skills during this period further aggravates the symptoms of cognitive decline, where the brain becomes accustomed to instant stimuli but loses the ability to think deeply and reflectively.

One of the factors that exacerbates the literacy crisis and the phenomenon of brain rot among Indonesian students is the weakness of the curriculum in fostering reflective thinking skills. The main weakness of the curriculum in developing reflective thinking lies in its tendency to focus more on mastering cognitive and academic aspects only, thereby providing little room for students to develop critical and reflective thinking skills. A prescriptive curriculum that is oriented towards memorization often neglects the importance of introspection, in-depth analysis, and self-evaluation in learning. In addition, the dominant learning method is one-way and provides little opportunity for students to ask questions, discuss, and practice reflection on their own learning experiences. As a result, students are less accustomed to consciously thinking about the learning process, their strengths and weaknesses, as well as their relation to real life. A curriculum that is inflexible and does not actively foster a culture of reflection further reinforces this weakness and hinders the development of character and higher-order thinking competencies that are important in facing the challenges of the 21st century.

One of the root problems of the low quality of digital literacy among Indonesian students is the minimal systematic training for teachers and students in understanding and utilizing technology critically and productively (Du et al. 2022). In many cases, the digitalization of learning is limited to the use of devices and platforms, without accompanied by in-depth training on how to sift through information, build digital ethics, and think reflectively in the digital space. Teachers, who are essentially the front line of education, often do not receive adequate training to integrate digital literacy into meaningful learning processes. Meanwhile, students are left to explore the digital world without clear guidance, thus more often becoming passive instant content consumers rather than active critical users with high accuracy. The absence of this training exacerbates the symptoms of brain rot, where digital activities are not directed towards building literacy skills, but instead utilize focus, critical reasoning, and depth of thought.

Cultural Literacy Simulation in Schools: A Critical Evaluation of the Gerakan Literasi Sekolah (GLS) and Its Relevance to Students' Digital Culture

Gerakan Literasi Sekolah (GLS) launched by the Ministry of Education and Culture in 2015 is a response to the low literacy index of Indonesian students. This program is designed to cultivate a culture of reading, writing, and critical thinking in schools through activities such as reading for 15 minutes before lessons, setting up reading corners, literacy competitions, and integrating literacy into cross-subject learning. However, after nearly a decade of implementation, the effectiveness of GLS deserves to be critically re-evaluated in the context of the development of digital culture that is changing students' interaction patterns with texts, information, and media.

Conceptually, GLS has a transformative vision to build a culture of literacy as the foundation of the nation's civilization. However, in its implementation, many schools only carry out GLS in the form of a ceremonial and superficial simulation of a literacy culture. The 15-minute reading activity is often conducted without guidance, reflection, or active student involvement in the selection of reading materials. Literacy is reduced to an administrative routine, rather than being a part of a vibrant learning ecosystem.

Moreover, GLS has not shown qualitative indicators that can measure changes in students' literacy behavior in depth. In many cases, literacy activities are only focused on quantitative output such as the number of books read, rather than on the processes of understanding, critical thinking, or reflective skills. This is where the deviation occurs between substantive literacy culture and procedural literacy which is framed merely as a formal program.

Another structural aspect that should be critiqued is the lack of capacity support for teachers in developing innovative literacy strategies. Teachers not only need technical training but also pedagogical approaches that can bring texts to life as bridges for thinking and dialogue. The

disparity in literacy infrastructure in various areas, from access to books, internet networks, to reading spaces, further exacerbates the uneven implementation of GLS in the field.

Massive digital transformation has changed the way students access, process, and share information. Students today are more accustomed to consuming information in short, interactive visual-audio formats, and instantly connected through social media algorithms like TikTok, Instagram, or YouTube. On the other hand, GLS still heavily relies on traditional literacy approaches that are not contextual to this digital reality.

GLS has essentially not succeeded in achieving a convergence between conventional literacy and digital literacy. There is no systemic approach in this program that explicitly targets critical thinking skills towards digital information, the ability to evaluate online sources, or responsible digital content production practices. In fact, literacy in the 21st century not only includes the ability to read texts but also encompasses digital, visual, and media literacy. This gap causes GLS to lose relevance and appeal for students. Literacy activities in schools cannot compete with the much more engaging, interactive, and rapid digital ecosystem. In many cases, students actually develop their own forms of literacy outside of school through writing fiction online, creating educational content, or discussing on digital platforms that ironically are not facilitated or officially recognized by the education system.

To meet this challenge, GLS needs to be reformulated by adopting an inclusive, adaptive, and relevant digital literacy approach that aligns with students' daily practices. For example, literacy should not only be taught through printed books, but also through book review vlogs, podcast projects, online reading collaborations, and information literacy that encourages students to recognize biases, hoaxes, and digital manipulation. This does not mean replacing conventional literacy, but rather expanding its definition in accordance with the dynamics of the times.

Strategy Solutions and Recommendations

In facing a literacy crisis exacerbated by a fast and shallow digital consumption culture, a strategic approach is needed that goes beyond slogans and rituals. 21st-century literacy is no longer adequately supported by the narrow definitions of reading and writing, but demands critical, reflective, and ethical understanding in responding to the massive flow of information. Therefore, the following set of solution-oriented strategies is proposed as an integrative effort to revitalize the literacy culture of Indonesian students in a contextual and sustainable manner.

1. critical-based literacy

Most digital literacy programs in schools still focus on the technical skills of using devices, such as operating applications, browsing the internet, or accessing learning content. However, what is most urgent is to build critical-based digital literacy skills, which is the ability to assess the validity, credibility, and bias of the information consumed. In a world flooded with hoaxes, clickbait, and misinformation, students must be taught how to think skeptically, not just to think quickly.

Critical-based digital literacy emphasizes three main pillars: (1) ethical and safe access to information, (2) analytical evaluation of content and sources, and (3) responsible digital participation. Teachers need to be equipped with training to guide students in fact-checking, recognizing logical fallacies, and understanding how social media algorithms shape perceptions.

2. Reflective Pedagogical Innovation

To address the effects of digital overstimulation that weaken students' attention and depth of thinking, pedagogical approaches in the classroom need to shift towards reflective pedagogical innovations. One way is to restore the practice of slow reading, which involves reading slowly, thoughtfully, and dialogically, contrasting with the skimming habits prevalent in the digital world. Moreover, deep learning should be positioned as the primary goal of literacy education. Students should not only understand the content of readings but also be able to connect it with social context, values, and differing perspectives. In this regard, methods such as small group

discussions, literature circles, and literacy debates can serve as tools to strengthen critical reasoning, data-driven argumentation, and active listening skills.

3. The Role of Parents

The role of the family, particularly parents, is crucial in shaping children's literacy habits. In the midst of an aggressive digital culture, household intervention becomes the first line of defense in maintaining a balance between consumption and reflection. One recommended strategy is the implementation of consistent screen time limits based on mutual agreement rather than authoritarian prohibitions. Even more important is to build a culture of book discussion at home, where parents not only encourage their children to read but also engage in conversations about the content, characters, values, and conflicts in the readings. Parents also need to be literacy role models, for example, by demonstrating reading habits, writing journals, or critically following the news. Without exemplary behavior, the literacy message will lose its persuasive power.

4. Collaboration with Credible Educational Content Creators

Efforts to improve literacy will be more effective if they involve influential agents in the digital space, namely educational content creators who already have a wide audience among teenagers. Figures such as Jerome Polin, Zenius, or literacy accounts like @literasikece @zeniuseducation can become strategic partners in literacy campaigns that are adaptive to the digital ecosystem. However, this collaboration must be selective and quality-based. The government, schools, or literacy communities must be able to identify and collaborate with creators who are not only popular but also possess intellectual integrity and strong educational values. This synergy model will make literacy feel close, relevant, and enjoyable for students.

5. Regulation and Curation of Educational Content on Popular Platforms

The government, together with digital platform providers such as YouTube, TikTok, and Instagram, needs to formulate policies that encourage the curation and promotion of quality educational content. Current algorithms tend to favor viral content without considering educational value or public ethics. In this context, regulations are needed that require platforms to provide special educational channels, give curated labels (verified educational content), and limit the distribution of destructive content that impacts the cognitive degradation of young users.

In addition to regulations, an incentive approach can also be applied. For example, awarding creators who successfully increase reading interest or present literacy in an innovative format. This is a form of policy shift from a repressive approach to a participatory and collaborative one.

CONCLUSION

The phenomenon of brain rot that is deeply rooted in the digital culture of Indonesian youth reflects an undeniable literacy crisis. Exposure to instant digital content that is fast, shallow, and hyperactive has proven to reduce focus ability, weaken working memory, and disrupt the development of students' critical and reflective thinking. Although Indonesia has implemented the Gerakan Literasi Sekolah (GLS) in response to the low literacy index, critical evaluation shows that this program is still operating ceremonially and has not fully adapted to the consumption patterns and characteristics of digital natives.

The mismatch between conventional literacy approaches and the digital ecosystem that surrounds students' daily lives has become one of the main weaknesses in current literacy policy interventions. As a result, students are more attracted to and accustomed to engaging yet superficial digital content, while their ability to read deeply, think critically, and evaluate information analytically is increasingly eroded.

In facing this challenge, the solutions offered must not stop at merely increasing reading frequency, but should focus on transforming the literacy approach to be more reflective, adaptive, and critically digital-based. Strategies that involve integrating digital literacy into the curriculum, teacher training, healthy screen time restrictions at home, collaboration with educational content

creators, and regulating algorithms of digital platforms, become integral steps to rebuild a literacy ecosystem that is relevant to the times.

Thus, the literacy crisis exacerbated by digital culture is not an isolated problem, but rather a result of the unpreparedness of the educational system and society in responding to the massive information transformation. To overcome this crisis, cross-sector commitment is needed from education, families, media, and the government to develop a literacy culture that is not only about being literate but also about understanding meaning, being media literate, and being reflective.

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