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Mental Health Crisis in Elementary School Students: The Hidden Impact of Academic Pressure and Digitalization

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A B S T R A C T

The mental health of elementary school students is increasingly challenged by intensified academic demands and pervasive digitalization, creating multidimensional stress that affects neuropsychological development. This study critically examines the relationship between academic pressure, digital exposure, and mental health disturbances using an interdisciplinary approach integrating developmental neuropsychology, critical pedagogy, and child development theory. A qualitative systematic literature review analyzed studies published from 2021 to 2025, synthesizing evidence on stress mechanisms, cognitive overload, and emotional dysregulation. Findings indicate that excessive academic expectations and uncontrolled digital engagement contribute to heightened anxiety, depression, cognitive fatigue, and impaired emotional regulation. The results underscore the need for adaptive humanistic-digital educational paradigms to support cognitive, emotional, and social well-being in foundational learning environments.

INTRODUCTION

Elementary education is undergoing significant transformation due to the integration of digital technology and rising global academic performance standards, creating complex learning environments. This shift has introduced new pressures that extend beyond traditional classroom dynamics, affecting young students' psychological well-being during critical developmental stages (World Health Organization, 2023). At this foundational age, children are still developing emotional regulation, cognitive control, and social competencies, making them particularly vulnerable to stressors related to performance expectations and digital immersion (Smith & Lee, 2022). Mental health in children encompasses emotional, psychological, and social well-being, enabling them to realize their potential, manage daily challenges, and engage productively in learning and community life (Kessler et al., 2021). When compromised, these capacities can negatively influence academic achievement, peer relationships, and long-term health outcomes (Garrison et al., 2024).

With the proliferation of digital tools in education, schools increasingly rely on electronic platforms, interactive apps, and online instruction to facilitate learning, often replacing aspects of traditional face-to-face engagement (Martinez & Nguyen, 2024). While digital learning offers expanded access, flexibility, and resources, it also demands rapid technological adaptation from students who may lack preparedness for new cognitive and attentional challenges (Zhao & Pérez, 2023). Extended screen time, multimedia stimuli, and constant connectivity can contribute to cognitive overload and diminished capacity for sustained focus, particularly among young learners whose executive functions are still maturing (Anderson et al., 2021). These emerging pressures illustrate a paradigmatic shift in the educational experience, highlighting both the opportunities and risks of technological integration for students' mental wellness.

In addition to technological demands, intensified academic expectations driven by competitive school cultures and parental aspirations further compound stress for elementary students (Li & Thompson, 2023). Curricula that prioritize performance metrics, ranking, and standardized outcomes risk placing disproportionate burden on children who are developmentally unprepared for such pressures (O'Donnell & Shepard, 2025). Early academic stress may manifest as heightened anxiety, performance avoidance, and learned helplessness, undermining intrinsic motivation and positive attitudes toward learning (Fletcher et al., 2022). Notably, this academic pressure often coexists with digital engagement, yet research has tended to examine these influences separately rather than as interrelated contributors to child well-being (Kumar & Rahman, 2024). Such fragmented investigation limits understanding of how academic and digital stressors interact within the developing child's psychological landscape.

Despite increasing recognition of these challenges, significant empirical gaps remain in current literature, particularly regarding the intertwined effects of academic pressure and digital exposure on early childhood mental health. Most studies focus on adolescents and older learners, with fewer examining primary school populations where developmental vulnerability is pronounced (Sullivan et al., 2023). Moreover, national research in Indonesia has largely addressed academic stress and technology use independently, without synthesizing their combined impact in a holistic framework (Pranoto, 2022). International systematic reviews have similarly highlighted the need for interdisciplinary inquiry that integrates neurodevelopmental, educational, and psychosocial perspectives (Rodriguez & Murray, 2024). Addressing these gaps is essential for advancing theory, informing practice, and guiding policy interventions tailored to the unique needs of young learners.

Building upon these theoretical foundations, this study aims to critically explore the relationship between academic pressure, digitalization, and mental health disturbances in elementary school students. Specifically, the research examines how intensified academic demands and pervasive digital engagement interact to influence psychological outcomes such as anxiety, emotional dysregulation, and cognitive fatigue. By adopting an interdisciplinary lens that integrates developmental neuropsychology, critical pedagogy, and child development theory, this paper seeks to extend beyond isolated variables toward a synthesized understanding of multifaceted stress mechanisms. Such an approach can inform holistic educational strategies that prioritize well-being alongside cognitive and academic growth.

The urgency of this research is underscored by contemporary educational reforms and technological proliferation in both global and Indonesian contexts, where digital platforms have become central to teaching and learning processes. Understanding how these forces shape the mental health of young learners is critical not only for academic success but also for lifelong emotional resilience, social competence, and healthy development. This investigation therefore contributes to scholarly discourse while offering practical insights for educators, parents, and policymakers to cultivate learning environments that support both intellectual achievement and psychological well-being.

LITERATURE REVIEW

Child Developmental Neuropsychology and Mental Health Vulnerability

The mental health of elementary school students is closely linked to neuropsychological development because middle childhood represents a critical period for brain maturation and socio-emotional growth. During this developmental stage, the prefrontal cortex continues to mature and plays a central role in executive functions, emotional regulation, attention control, and decision-making processes. Developmental neuroscience research indicates that children's brains are highly plastic and responsive to environmental influences, making them particularly vulnerable to chronic stress and adverse experiences (Gee & Cohodes, 2021). Persistent exposure to stressors may alter neural pathways involved in emotional processing and self-regulation, thereby increasing susceptibility to psychological difficulties (McLaughlin et al., 2021). In

the Indonesian context, research by Puspitawati et al. (2022) demonstrated that family and environmental conditions significantly influence children's emotional and psychological development during the elementary school years.

Recent studies have further emphasized that prolonged activation of stress-response systems can impair cognitive functioning, including working memory, attention, and emotional control. According to Sheridan and McLaughlin (2020), adverse developmental experiences may disrupt neurocognitive development and increase the likelihood of anxiety-related symptoms during childhood. Emotional and behavioral difficulties experienced by students often affect academic engagement, peer relationships, and learning motivation. Supporting this perspective, Fitriani et al. (2024) reported that mental health problems among Indonesian students are increasingly associated with educational pressures and psychosocial challenges. Therefore, developmental neuropsychology provides a valuable framework for understanding how environmental and educational factors shape children's mental health trajectories.

Academic Stress Theory and Psychological Consequences

Academic stress refers to a condition in which educational demands exceed students' developmental capacities and coping resources. In elementary education, academic stress may emerge from intensive curricula, achievement-oriented evaluation systems, parental expectations, and increasingly competitive learning environments. Research conducted by Pascoe, Hetrick, and Parker (2020) found that academic stress is significantly associated with psychological distress, anxiety symptoms, and decreased well-being among students. Excessive educational demands may also reduce intrinsic motivation and negatively affect students' engagement in learning activities.

Furthermore, prolonged exposure to academic pressure can lead to maladaptive psychological responses, including fear of failure, emotional exhaustion, and learned helplessness. Putwain and von der Embse (2021) reported that students experiencing high levels of academic stress tend to exhibit lower self-confidence and greater school-related anxiety. Similar findings have been reported in Indonesia, where Sari and Neviyarni (2023) found that unrealistic academic expectations from parents and teachers contributed to elevated stress levels among elementary school students. These findings suggest that educational systems should prioritize developmental appropriateness and emotional well-being alongside academic achievement. Consequently, a balanced educational approach is necessary to foster both psychological resilience and academic success.

Educational Digitalization and Child Cognition

Digitalization has transformed educational practices by expanding access to information, increasing instructional flexibility, and facilitating interactive learning experiences. Since the COVID-19 pandemic, digital technologies have become an integral component of educational systems worldwide, including at the elementary school level. Digital learning environments offer opportunities for personalized learning and enhanced access to educational resources (Bond et al., 2021). However, increasing dependence on digital technologies has also raised concerns regarding children's cognitive and psychological development.

Research has shown that prolonged screen exposure and intensive digital engagement may contribute to attentional difficulties, cognitive overload, and reduced deep-learning capacity. According to Madigan et al. (2022), excessive screen time among school-aged children is associated with poorer executive functioning and emotional well-being. Similarly, Livingstone and Stoilova (2021) argued that digital environments may expose children to psychological risks, including emotional distress and social isolation, when not appropriately managed. In Indonesia, Rahmawati et al. (2024) found that excessive use of digital learning platforms increased mental fatigue and emotional stress among elementary students, particularly when accompanied by substantial academic workloads. Therefore, educational digitalization should be implemented through developmentally appropriate strategies that maximize learning benefits while minimizing psychological risks.

Critical and Humanistic Pedagogy in the Age of Artificial Intelligence

Critical pedagogy emphasizes that education should empower learners to become reflective, autonomous, and socially responsible individuals rather than merely fulfilling standardized performance expectations. Contemporary educational systems frequently prioritize measurable outcomes and accountability indicators, which may inadvertently overlook students' emotional and psychological well-being. According to Biesta (2022), excessive emphasis on educational effectiveness can reduce opportunities for meaningful personal growth and democratic participation. Consequently, educational success should be assessed not only through academic achievement but also through students' holistic development.

Humanistic pedagogy complements this perspective by emphasizing empathy, self-actualization, emotional growth, and meaningful teacher–student relationships. As artificial intelligence becomes increasingly integrated into educational environments, scholars have highlighted the importance of preserving human values within technologically enhanced learning systems. Holmes et al. (2022) argued that artificial intelligence should function as a supportive educational tool rather than a substitute for human interaction and moral development. Supporting this view, Hidayat and Kurniawan (2024) emphasized that integrating socio-emotional learning and digital ethics into Indonesian school curricula is essential for fostering responsible digital citizenship among young learners. Therefore, a humanistic-digital educational paradigm is required to ensure that technological advancement contributes positively to children's cognitive, emotional, and social development.

METHODOLOGY

This study employed a qualitative research approach using a systematic literature review (SLR) design combined with an interdisciplinary critical analysis. The systematic literature review method was selected because it enables researchers to identify, evaluate, and synthesize scientific evidence from previous studies in a transparent and structured manner, thereby producing comprehensive insights into a particular phenomenon (Snyder, 2019; Xiao & Watson, 2019). The focus of this study was to examine the relationship between academic pressure, educational digitalization, and mental health problems among elementary school students. To strengthen theoretical interpretation, the review integrated perspectives from developmental neuropsychology, academic stress theory, digital learning studies, and critical-humanistic pedagogy. This approach was considered appropriate because the phenomenon under investigation involves complex interactions among cognitive, emotional, social, and technological factors.

The literature search was conducted through major academic databases, including Scopus, Web of Science, and complementary sources such as Google Scholar. The search process utilized combinations of keywords including mental health, elementary school students, academic pressure, academic stress, digital learning, educational digitalization, online learning, child neuropsychology, and student well-being. Only studies published between 2021 and 2025 were considered to ensure the inclusion of recent evidence regarding digital learning environments and child mental health. Inclusion criteria consisted of peer-reviewed journal articles, empirical studies, review articles, and scholarly publications directly related to elementary education, academic stress, digitalization, and mental health outcomes. Articles unrelated to the topic, duplicate records, conference abstracts, and studies lacking sufficient methodological information were excluded from the review process (Page et al., 2021).

The study selection process followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to ensure methodological transparency and reproducibility. As illustrated in Figure 1, a total of 539 records were identified from database searches, consisting of 376 articles from Scopus and 163 articles from Web of Science. After removing duplicate records (n = 2), 537 studies remained for screening. During title and abstract screening, 449 records were excluded because they were not directly relevant to the research topic. Subsequently, 88 reports were sought for retrieval, of which 2 reports could not be accessed. The remaining 86 full-text articles were assessed for eligibility, resulting in the exclusion of 61 studies that did not meet the inclusion criteria. Finally, 25 studies were included in the qualitative synthesis and critical review (Page et al., 2021).

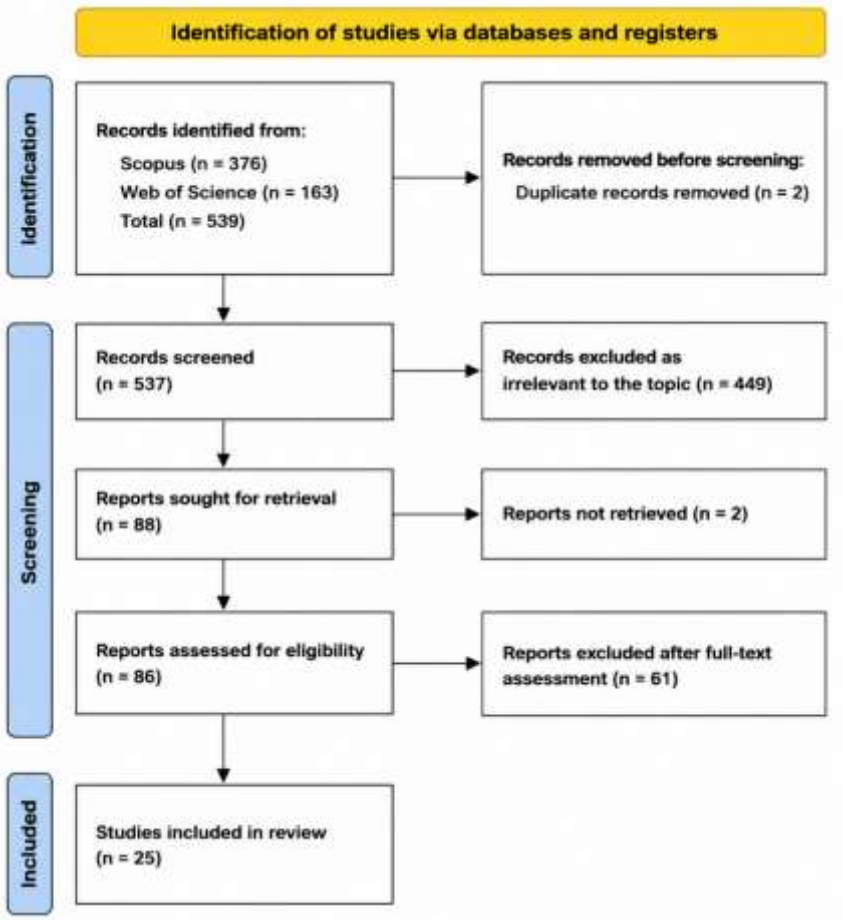

Figure 1. PRISMA 2020 Flow Diagram of Study Selection Process

The selected studies served as the primary unit of analysis rather than individual respondents. Data were collected through systematic documentation and literature extraction procedures. Information extracted from each article included author information, publication year, country of study, research design, participant characteristics, key findings, theoretical frameworks, and implications related to mental health, academic stress, and educational digitalization. To enhance the rigor of the review process, all studies were evaluated based on relevance, methodological quality, and contribution to the research objectives. The literature management process was supported by reference management software to facilitate organization, screening, and citation tracking (Paul & Criado, 2020).

Data analysis was conducted using the interactive model of Miles, Huberman, and Saldaña (2020), consisting of three interconnected stages: data reduction, data display, and conclusion drawing/verification. During the data reduction stage, relevant findings were coded and categorized according to major themes, including neuropsychological development, academic stress, digital learning, and pedagogical approaches. The data display stage involved organizing the extracted evidence into thematic matrices to identify patterns, similarities, and differences across studies. Finally, conclusions were generated through iterative interpretation and cross-study comparison to identify dominant factors affecting elementary students' mental health in digital learning

environments. This analytical procedure enabled the development of a comprehensive understanding of how academic pressure and digitalization contribute to psychological outcomes among young learners.

RESULTS & DISCUSSION

Academic Pressure as a Structural Driver of Mental Health Problems

The systematic review of 25 selected studies revealed that academic pressure consistently emerged as one of the most influential factors affecting the mental health of elementary school students (Putwain & von der Embse, 2021). Across different educational contexts, students reported elevated anxiety, emotional exhaustion, and diminished motivation due to performance-oriented learning environments (Pascoe et al., 2020). The reviewed studies demonstrated that academic stress was not solely generated by curricular demands but also by parental and teacher expectations, as well as school accountability systems (Sari & Neviyarni, 2023). In several studies, students experienced feeling overwhelmed by frequent assessments and high performance expectations, which interfered with focus and social interaction (Fitriani et al., 2024). These findings suggest that academic pressure has evolved into a chronic psychological burden, directly affecting students' cognitive and emotional well-being (Puspitawati et al., 2022).

The analysis further indicated that academic stress is embedded within systemic educational structures (Putwain & von der Embse, 2021). Assessment systems often create environments where children perceive learning as constant evaluation, contributing to fear of failure and emotional withdrawal (Pascoe et al., 2020). In Indonesia, studies demonstrated that the combination of academic demands and digital learning increased stress levels among primary students (Rahmawati et al., 2024). Therefore, academic pressure should be understood as a structural issue rather than an isolated individual challenge (Sari & Neviyarni, 2023). Chronic exposure to such systemic stress was found to affect both cognitive performance and emotional regulation (Fitriani et al., 2024).

Another important result concerns cognitive functioning, showing that sustained academic stress impairs attention, working memory, and executive control (McLaughlin et al., 2021). Children exposed to these stressors often had reduced engagement in learning activities and lower intrinsic motivation (Puspitawati et al., 2022). This finding aligns with neuropsychological theories that chronic stress disrupts the development of executive functions during middle childhood (Gee & Cohodes, 2021). Consequently, students under high academic pressure may exhibit performance deficits despite increased time spent on learning tasks (Putwain & von der Embse, 2021).

Finally, this review highlights that academic stress is increasingly mediated by digital educational practices (Rahmawati et al., 2024). Previous studies analyzed academic pressure in isolation, but evidence now indicates that digital learning expectations amplify the psychological burden of academic performance. This integrated perspective situates academic stress within a socio-digital ecosystem, contributing to the rising prevalence of mental health issues among elementary school students (Fitriani et al., 2024).

Educational Digitalization as a Cognitive and Emotional Challenge

Educational digitalization was found to generate both cognitive and emotional challenges for children. Digital platforms enhance learning opportunities, interactivity, and access to resources, but excessive use also increases cognitive load and mental fatigue (Madigan et al., 2022). Students frequently reported difficulties maintaining attention and processing complex information when using digital devices intensively (Livingstone & Stoilova, 2021). In Indonesia, studies revealed that extended screen time in digital learning contexts increased emotional stress and decreased motivation (Rahmawati et al., 2024). These findings demonstrate that digital learning environments can simultaneously support and challenge children's cognitive and emotional capacities (Bond et al., 2021).

Cognitive overload emerged as a major consequence, where intrinsic and extraneous cognitive demands exceeded students' working memory capacity (Madigan et al., 2022). Students exposed to multiple stimuli, including multimedia and gamified learning, experienced fragmented attention and reduced deep-learning capacity (Livingstone & Stoilova, 2021). Additionally, digital reward mechanisms triggered dopaminergic responses that shifted motivation toward instant gratification rather than sustained engagement (Bond et al., 2021). These findings suggest that instructional design must consider both cognitive and emotional implications to optimize digital learning outcomes (Rahmawati et al., 2024).

Another result highlighted emotional dysregulation due to prolonged digital exposure. Children reported increased irritability, fatigue, and difficulties in managing frustration when learning heavily depended on digital platforms (Sari & Neviyarni, 2023). Reduced direct social interactions also contributed to feelings of isolation and anxiety (Fitriani et al., 2024). This confirms that educational digitalization is not neutral; it interacts with psychological vulnerabilities to produce measurable impacts on well-being (Livingstone & Stoilova, 2021).

Finally, the review revealed a dual function of digitalization: it simultaneously augments educational access while acting as a psychological stressor. This "cognitive paradox" highlights the necessity for balanced implementation strategies, ensuring that technology facilitates learning without compromising emotional and cognitive health (Madigan et al., 2022; Rahmawati et al., 2024).

Dialectics Between Academic Pressure and Digitalization

The synthesis of the selected studies revealed that academic pressure and educational digitalization do not operate as independent variables but rather interact through a mutually reinforcing relationship. Students who experienced higher academic demands were more likely to increase their use of digital learning platforms in an effort to meet performance expectations (Tawfik et al., 2023). At the same time, digital learning environments often introduced additional cognitive demands that intensified psychological strain and reduced learning efficiency (Castañeda & Selwyn, 2024). Evidence from Indonesian elementary schools indicated that students frequently perceived online

assignments and digital assessments as extensions of academic pressure rather than as supportive learning tools (Nurhayati & Hidayah, 2024). These findings suggest that digitalization has become embedded within the broader structure of academic expectations, thereby amplifying its psychological impact on young learners.

A recurring pattern identified across the reviewed literature was the emergence of a negative feedback cycle linking academic pressure and digital engagement. High academic expectations encouraged students to spend more time interacting with digital learning platforms, educational applications, and online resources (Wang et al., 2022). Increased exposure to these technologies subsequently generated cognitive overload, attentional fragmentation, and mental fatigue, reducing students' capacity to process information effectively (Kross et al., 2021). As learning performance declined, students often experienced renewed pressure to improve academic outcomes, further increasing reliance on digital tools (Yuliana et al., 2023). This cyclical mechanism demonstrates how academic and technological demands can jointly contribute to sustained psychological stress among elementary school students.

Another important finding concerns the role of digital environments in expanding the scope of educational competition. Traditional academic competition was previously limited to classroom interactions and local school contexts. However, digital learning platforms increasingly expose students to broader comparisons through online rankings, performance dashboards, and peer achievement visibility (Howard et al., 2023). In Indonesia, the rapid adoption of educational technologies has also increased students' awareness of academic standards beyond their immediate environments, contributing to heightened performance anxiety and self-evaluative concerns (Kurniawati & Prasetyo, 2024). Consequently, digitalization not only facilitates learning but also broadens the social and psychological dimensions of academic pressure.

A particularly significant contribution of this review is the identification of an integrated explanatory framework describing how academic pressure and digitalization interact to influence mental health outcomes. Previous studies generally examined these factors separately, focusing either on academic stress or technology-related consequences (Lembke, 2023). In contrast, the present findings indicate that the interaction between these variables constitutes a distinct mechanism that accelerates psychological vulnerability among elementary school students. This integrated perspective advances current knowledge by demonstrating that mental health challenges in contemporary education cannot be fully understood without considering the combined influence of academic structures and digital environments. As a result, interventions targeting student well-being should address both dimensions simultaneously rather than treating them as isolated issues.

Neuropsychological Vulnerability and Emerging Mental Health Risks

The review identified emotional dysregulation as one of the most prominent neuropsychological consequences associated with the combined effects of academic pressure and educational digitalization. Children exposed to sustained academic demands frequently exhibited heightened emotional reactivity, increased irritability, and reduced tolerance for frustration (Pfeifer & Allen, 2021). Several studies reported that persistent educational stress disrupted children's ability to manage negative emotions effectively, resulting in greater susceptibility to anxiety-related symptoms (Morin-Major et al., 2022). Indonesian evidence similarly demonstrated that emotionally exhausted students often experienced difficulties maintaining positive peer relationships and classroom engagement (Saputra & Anggraeni, 2024). These findings indicate that emotional regulation mechanisms may be compromised when children are exposed to prolonged educational and technological stressors.

Executive functioning difficulties also emerged as a major theme across the reviewed studies. Research consistently showed that students facing excessive academic and digital demands experienced impairments in planning, attention control, working memory, and inhibitory regulation (Best & Miller, 2023). Such difficulties are particularly concerning because executive functions serve as foundational skills supporting learning, problem-solving, and adaptive behavior. In several studies, reduced executive functioning was associated with declining academic performance despite increased learning effort (Domingues-Montanari, 2022). Indonesian studies further reported that children experiencing high levels of educational stress often demonstrated decreased self-regulation and increased impulsivity during learning activities (Wulandari & Setiawan, 2023). These results suggest that mental health challenges are closely linked to neurocognitive development rather than representing purely emotional phenomena.

Another significant finding involves changes in motivational orientation. Across multiple studies, students increasingly demonstrated a shift from intrinsic learning motivation toward extrinsic, reward-driven behaviors (Ryan & Deci, 2024). Educational activities became increasingly associated with grades, digital rewards, external validation, and performance outcomes rather than curiosity or personal mastery. This tendency was particularly evident in technology-mediated learning environments where instant feedback and gamification mechanisms were frequently employed (Zhang & Su, 2023). Indonesian research similarly observed that students who spent substantial time in digital learning environments often became more dependent on external reinforcement and less engaged in reflective learning processes (Rahman & Suryadi, 2024). Such motivational shifts may undermine long-term learning resilience and reduce students' capacity for self-directed learning.

The most important finding emerging from this review is the identification of a multidimensional vulnerability pathway connecting academic pressure, digitalization, cognitive overload, emotional dysregulation, executive dysfunction, and declining psychological well-being. Rather than operating independently, these factors interact dynamically throughout children's developmental experiences (Hadar-Shoval et al., 2024). Several studies suggested that prolonged exposure to this combination of stressors may increase the risk of anxiety disorders, depressive symptoms, and early manifestations of academic burnout during childhood (Fusar-Poli et al., 2022). Evidence from Indonesia also indicated growing concerns regarding mental health difficulties among younger learners exposed to intensive academic and technological demands (Pratiwi & Lestari, 2025). This integrated vulnerability model represents a novel contribution of the present study because it explains how contemporary educational systems may simultaneously influence cognitive, emotional, and motivational domains, thereby shaping the emerging mental health crisis among elementary school students.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that the mental health crisis among elementary school students is a multidimensional phenomenon driven by the interaction between increasing academic pressure and pervasive educational digitalization. The systematic review revealed that excessive academic demands contribute to anxiety, emotional exhaustion, reduced intrinsic motivation, and cognitive strain, while uncontrolled digital engagement increases cognitive overload, attentional fragmentation, emotional dysregulation, and psychological vulnerability. The findings further demonstrate that academic pressure and digitalization operate through a mutually reinforcing mechanism that amplifies neuropsychological risks, including executive dysfunction, emotional instability, and declining well-being. The novelty of this study lies in proposing an integrated vulnerability framework that explains how academic and digital stressors jointly influence children's cognitive, emotional, and motivational development.

However, this study is limited by its reliance on secondary data from published literature, the heterogeneity of research designs among the reviewed studies, and the limited availability of longitudinal evidence focusing specifically on elementary school populations. Therefore, schools, parents, and policymakers are encouraged to adopt a humanistic-digital educational approach that balances academic achievement, technological integration, and socio-emotional development. Educational policies should prioritize mental health support, developmentally appropriate learning practices, digital literacy, and healthy technology use to foster sustainable student well-being in contemporary learning environments.

ADVANCED RESEARCH

Future research should employ longitudinal and mixed-methods designs to investigate the long-term effects of academic pressure and digitalization on children's neuropsychological development and mental health. Further studies are also needed to examine the effectiveness of humanistic-digital educational interventions, socio-emotional learning programs, and artificial intelligence–assisted learning environments in promoting psychological well-being among elementary school students across diverse cultural and educational contexts.

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