



Research development about digital resilience: A scoping review

Pengembangan penelitian tentang ketahanan digital: Scoping review

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ABSTRACT

The increased use of technology from 2022 to early 2024 has had a significant impact, including an increase in issues such as cyberbullying, cybercrime, phishing, and the impact on mental health. Digital resilience is the focus of research as a potential solution. The method in this study is in the form of scoping reviews from the past which are prioritized in the search for data related to problems published in the last 24 years. The last year, 2001 – 2024. There were 82 scientific articles that included qualitative and quantitative journals, but we identified 14 studies that met the search and eligibility criteria in the international journals we found. These findings show that there are benefits to the implementation of digital resilience in dealing with the negative influence of digital technology. The results of this analysis show that the important role of digital resilience for every individual, especially adolescents, can be used as a reference as a solution to deal with the negative influence of cyber bullying and the negative impact of social media.

KEY WORDS:

digital resilience; resilience; youth; scoping review

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ABSTRAK

Peningkatan penggunaan teknologi dari 2022 hingga awal 2024 memiliki dampak signifikan, termasuk peningkatan masalah seperti cyberbullying, cybercrime, phishing, dan dampak pada kesehatan mental. Digital resilience menjadi fokus penelitian sebagai solusi potensial. Metode dalam penelitian ini berupa scoping review dari terdahulu yang diprioritaskan dalam pencarian data terkait problematika yang diterbitkan dalam 24 tahun terakhir. Tahun terakhir, 2001 – 2024. Terdapat 82 artikel ilmiah yang termasuk jurnal kualitatif dan kuantitatif, akan tetapi kami mengidentifikasi terdapat 14 studi yang memenuhi kriteria pencarian dan kelayakan pada jurnal internasional yang kami temukan. Temuan ini menunjukkan bahwa adanya manfaat implementasi dari digital resilience dalam menghadapi pengaruh negatif dari teknologi digital. Hasil analisis ini menunjukkan bahwa peran penting digital resilience bagi setiap individu khususnya remaja yang dapat dijadikan rujukan sebagai solusi menghadapi pengaruh negatif cyber bullying dan dampak negatif media sosial.

KATA KUNCI

ketahanan digital; ketahanan; remaja; tinjauan cakupan



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Introduction

The use of technology worldwide has increased significantly from 2022 to early 2024 because of government policies encouraging people to stay indoors as a result of the COVID-19 pandemic (Chockalingam et al., 2020; S. Lee et al., 2022; Shumaker & Manning, 2022). This situation has led to increased interest in various types of digital entertainment, particularly online games (Li & Guo, 2022; Naaj & Nachouki, 2021), as well as prolonged screen time causing addiction (Saritepeci et al., 2023). Statistical data from the United States shows that the use of information technology, especially the internet, has reached 5.35 billion users worldwide, equivalent to 66.2% of the global population. In fact, research from Kominfo has produced that at least 80% of children and adolescents around the world are active users of the internet and digital media.

However, it is essential to highlight that while digital technology facilitates communication and collaboration among individuals (Li & Guo, 2022), it also poses significant challenges, particularly for adolescents. One such challenge is cyberbullying, which frequently occurs on platforms such as Instagram, TikTok, X, and WhatsApp (David-Ferdon & Hertz, 2007; Kemkominfo, 2018; Siddiqui &

Singh, 2016). Among these, cyberbullying emerges as a prevalent and damaging Problem, particularly for digital natives (active digital technology users), significantly impacting mental and emotional well-being. Cyberbullying is not merely a social issue but a complex psychological stressor that exacerbates vulnerabilities among adolescents. The impact on mental health, including anxiety, depression, and emotional distress, highlights the urgency of a preventative and adaptive approach (Andrie et al., 2021; Kwak et al., 2022; Twenge, 2020).

The existence of cyberbullying cases is one of the main problems arising from the use of digital technology, especially for those who are digital natives (active users of digital technology). These cases have a significant impact on the mental state of technology users. This has been proven in previous studies that emphasize the need for a structured solution to address emotional and psychological harm caused by cyber challenges (Przybylski et al., 2014; Boh et al., 2023; Sharma et al., 2022). From these problems, the important role of each individual in facing the challenges of technology that continues to develop is needed. One of the most effective approaches to mitigate the adverse impact of digital environments is building digital resilience (Sage et al., 2021). Digital resilience refers to the ability to adapt positively in the face of all difficulties, tragedies, or problems caused by the use of technology and the internet. Several figures define digital resilience such as, in their research, explaining that digital resilience is a concept that refers to the process of learning, recovery, and adaptation after experiencing negative or adverse impacts. (A. Y. Lee & Hancock, 2023; Sharma et al., 2022).

Juvonen and Graham(2014) highlight that digital resilience serves as a dynamic process enabling individuals, particularly adolescents, to recover from stress and trauma caused by digital challenges. It includes abilities such as understanding digital risks, managing negative content, and regaining emotional stability. Then, according to the definition, digital resilience is the ability to absorb large shocks, adapt to disturbances caused by these shocks, and transform to a new stable state by utilizing digital technology (Savoia et al., 2021).

Building resilience in the digital world during adolescence is very important so that they can survive in digital and non-digital environments (Jonsson et al., 2019). Adolescents, as digital natives, require targeted interventions to strengthen their adaptive capacity. Through digital education, emotional support, and critical digital literacy, they can actively “bounce back” from cyber challenges and other risks (Andrie et al., 2021; Kwak et al., 2022;

Twenge, 2020). Additionally, adolescents have the ability to quickly “bounce back,” face challenges, overcome uncertainty, and recover better from traumatic events or events (Sage et al., 2021).

Some of the benefits of digital resilience for adolescents include the ability to maintain personal and other people’s confidentiality, the ability to protect themselves from negative actions in cyberspace, the ability to reject pornographic content, the ability to manage time, the ability to filter, analyze information, and maintain polite behavior in cyberspace (Boh et al., 2023; Sharma et al., 2022). Furthermore, digital resilience develops critical thinking skills to assess and analyze the authenticity of digital information, enabling adolescents to distinguish between credible and misleading content. This ability is crucial in the era of information overload, where exposure to false narratives, hoaxes, and sensationalized content is rampant (Przybylski et al., 2014).

By cultivating these skills, individuals not only enhance their decision-making processes but also build stronger mental filters to navigate the digital space responsibly (Sun et al., 2022; Wright, 2016). This, in turn, fosters a more informed, self-aware, and resilient generation capable of utilizing technology for positive growth and meaningful engagement (Reivich & Shatté, 2002). In addition, digital resilience also helps adolescents in developing a critical mindset when accessing digital information, so that it can reduce vulnerability to potentially harmful information for each individual, especially for adolescents who are considered digital natives, looking at the many benefits of digital resilience for adolescents which include various skills in facing risks and challenges in the digital world (Magutshwa & Radianti, 2022). This makes researchers interested in conducting research with the scoping review method to examine more deeply the existence of digital resilience as an effective solution to solve problems related to digital technology, especially cyber problems that can affect mental health conditions (Setyawati et al., 2022).

Method

The scoping review analysis in this article also follows the rules written in the PRISMA Extension for Scoping Reviews (PRISMA-ScR). Question identification is used to explore the results of the research. The questions include:

1. How is the research on digital resilience distributed?
2. What are the research approaches that are widely used in the topic of digital resilience research?
3. What research contexts are related to the topic of digital resilience research?

The researcher conducted a search on the database and studied the scoping review approach. Scientific article searches were conducted through 7 international journal sites and 1 national journal, namely Google scholar (4), science direct (25), Taylor (3), Springer link (25), sage research methods (0), web of science and Scopus (0).

The first search was carried out in February 2024 and the search continues until April 2024. From the entire search, a total of 16 articles were obtained from international and national journal articles. After analyzing various articles, 16 article studies were found that qualified and included in this article review. The inclusion criteria used are research on the topic of digital resilience, original research articles and literature reviews. The exclusion criteria used are articles that are not in accordance with the topic, namely digital resilience.

This research was conducted through consultation and charting assisted by several people. The consultation was carried out after analyzing the data and making a report on the results. The initial search resulted in 82 relevant abstracts and citations that were then analyzed through <https://www.rayyan.ai/>. Filtering was carried out continuously and found 15 duplicate articles. A total of 67 are included in the exclusion category.

Result

Digital resilience has gained significant attention as a protective factor against the challenges of the digital world, such as cyberbullying and other negative online behaviors. This review underscores its pivotal role in mitigating these impacts and fostering healthier digital engagement.

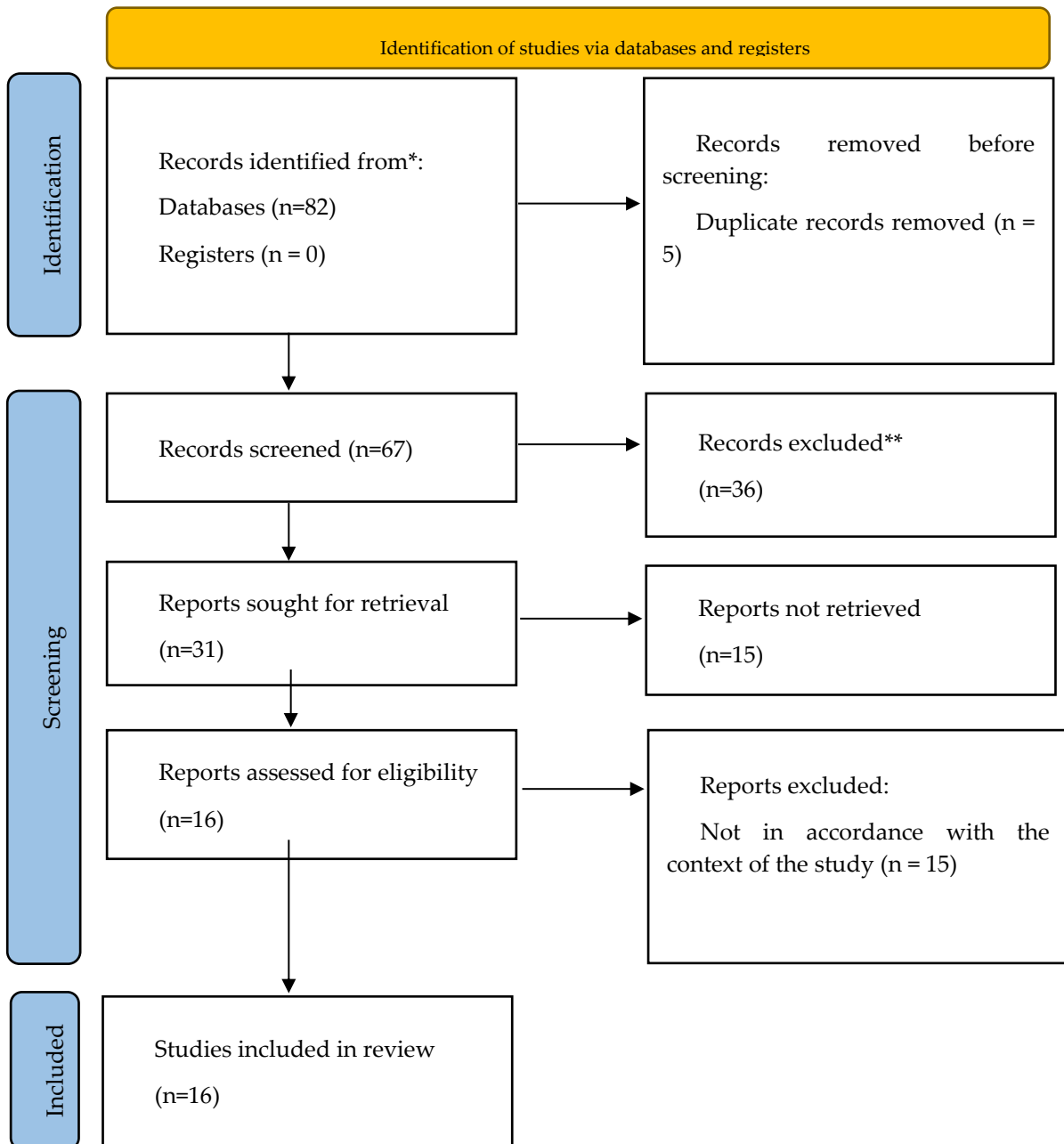
Based on the identification of studies, a total of 82 records were retrieved from databases. After removing duplicates ($n = 5$), 67 records were screened, and 36 were excluded due to irrelevance. Subsequently, 31 reports were sought for retrieval, but 15 could not be retrieved. Of the remaining 16 reports assessed for eligibility, only 16 were included in the final review. The majority of studies in this review used mixed methods, combining both qualitative and quantitative approaches. Notable methods included SEM, EFA, CFA, and pilot studies.

Geographical Distribution of Studies

The geographical distribution of the studies shows contributions from various regions: Singapore, the United Kingdom, the United States, and Malaysia (Boh et al., 2023); the Netherlands (van den Brink et al., 2021); Argentina (Guerra

et al., 2018); China (Pan et al., 2024); and India (Sharma et al., 2022). Other studies originated from Dutch (Reynolds & Parker, 2018) and Anglo-Saxon countries (Hammond & Cooper, 2015; A. Y. Lee & Hancock, 2023).

Figure 1
Flow Chart Prisma



Thematic Clusters in Digital Resilience Strategies

The analysis revealed two primary thematic clusters in digital resilience

strategies: protective factors and recovery frameworks, as well as education and community interventions. These clusters provide insights into the mechanisms and contexts that shape digital resilience, emphasizing both individual and collective approaches to navigating the challenges posed by the digital landscape.

First, protective factors and recovery frameworks. Recovery as an Individual Journey is similar to the notion of mental health recovery as an evolving journey, (Pan et al., 2024) emphasized protective factors contributing to adolescents digital resilience within a socio-ecological framework. This multi-faceted digital resilience is built through societal and familial support systems, akin to recovery environments in mental health. Than, (Behrendt et al., 2023) detailed how digital media enhances resilience during crises by fostering adaptability and transformation, highlighting the dynamic and individualized nature of resilience-building.

Second, education and community interventions. Ambivalence in recovery aligns with findings by (Guerra et al., 2018) where academic resilience was linked to the reflective use of digital feedback. These insights mirror the challenges in accepting ongoing conditions while maintaining progress. And in the Article to a acceptance as a process was also seen in (Hammond & Cooper, 2015) where professionals developed digital resilience by managing cyber-literacy, showcasing how coping mechanisms can evolve through continuous learning.

Role of family and peers in the parallels between family roles in recovery and digital resilience-building were illustrated (A. Y. Lee & Hancock, 2023) whose educational interventions enhanced primary students digital resilience. These interventions often included collaborative activities that mimicked familial and peer dynamics in recovery. - Technological Integration and Data-Driven Personalization

Advances in technology create opportunities for tailoring resilience strategies: to identify digital biomarkers and resilience in a broader perspective on personalized resilience was explored by (van den Brink et al., 2021), who identified digital biomarkers for health maintenance. These findings underline how both recovery and resilience can benefit from data-driven approaches for tailored support. And adaptive technologie to training protocols reviewed by (Soetekouw & Angelopoulos, 2024) and approaches to managing unhealthy digital behaviors (Sharma et al., 2022). Showcase how technology can intervene in crisis scenarios.

Third, the role of family and peer support. Parallels between familial roles

in recovery and digital resilience-building are evident. Interventions such as those in (A. Y. Lee & Hancock, 2023) replicate familial and peer dynamics in educational settings, enhancing primary students' resilience. This interconnectedness reflects how recovery frameworks rely heavily on collaborative and supportive environments.

Therefore, based on the findings emphasized by several previous studies, this analysis highlights the complex interaction between social, educational, and technological factors in enhancing digital resilience. It also stresses the need for evidence-based digital resilience strategies tailored to various contexts.

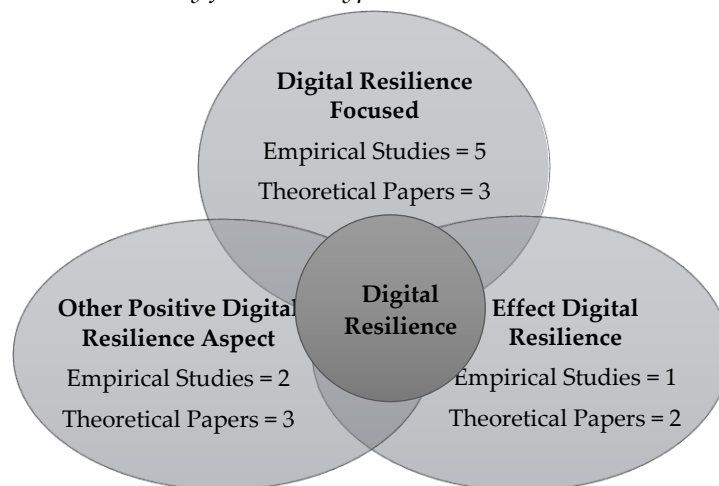
Geographic and Visually Methodological Insights

The studies spanned diverse origins, including the United States, Netherlands, Singapore, and China, providing a global view. Quantitative methods dominated, as seen in (A. Y. Lee & Hancock, 2023; Pan et al., 2024) while mixed methods offered nuanced insights into adaptive behaviors.

Implications the intersection of recovery and digital resilience highlights the need for adaptable, person-centered approaches. Whether through mental health recovery journeys or fostering resilience via digital technologies, a collaborative network involving individuals, families, and systems remains crucial.

Figure 3

Classification of included items, by focus and type, n = 16



Charting Data

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Author	Heading	Year	Method	Fill
(Boh et al., 2023)	Building Digital Resilience against Major Shocks	2023	SEM, EFA, CFA	In the article, it is explained how the population increases resilience with digital technology media. The population is also adapting and transforming in a crisis situation
(van den Brink et al., 2021)	Digital Resilience Biomarkers for Personalized Health Maintenance and Disease Prevention	2021	The authors use quantitative and qualitative analysis methods to collect data and identify digital resilient biomarkers that can be used to support the maintenance of personal health and disease prevention.	This article reviews digital resilient biomarkers for personal health maintenance and disease prevention.
(Guerra et al., 2018)	Digital Feedback and Academic Resilience	2018	The authors used quantitative and qualitative analysis methods to collect data and identify factors related to academic resilience.	This journal deals with the influence of digital review on academic resilience.
(Pan et al., 2024)	Protective factors contributing to adolescents' multifaceted digital resilience for their wellbeing: A socio-ecological perspective	2024	The authors used quantitative analysis methods to collect data and identify factors that affect adolescent digital resilience.	This article reviews the factors that help build digital resilience for adolescents, from the perspective of the social ecosystem.
(Hammond & Cooper, 2015)	Embracing Powerlessness in Pursuit of Digital Resilience: Managing Cyber-Literacy in Professional Talk	2015	The authors used quantitative and qualitative analysis methods to collect data and identify factors that affect digital resilience.	This article reviews how professionals can build digital resilience through skills management in using digital technologies.
(A. Y. Lee & Hancock, 2023)	Developing digital resilience: An educational intervention improves elementary students'	2023	The authors used quantitative methods to collect data from 100 elementary school students who had received the	This article reviews an educational intervention that aims to build digital resilience among primary school students.

Author	Heading	Year	Method	Fill
	response to digital challenges		intervention. The results of the study show that this intervention has influenced positive digital resilience among primary school students.	
(Wright, 2016)	Toward a Digital Resilience	2016	The authors used quantitative and qualitative analysis methods to collect data and identify factors that affect digital resilience.	This article reviews digital resilience and how to develop digital resilience.
(Soetekouw & Angelopoulos, 2024)	Digital Resilience Through Training Protocols: Learning To Identify Fake News On Social Media	2022	The authors used quantitative analysis methods to collect data and identify factors that affect digital resilience.	This article reviews how education protocols can help develop digital resilience in identifying fake news on social media.
(Nielsen et al., 2023)	Organizational Resilience and Digital Resources: Evidence from Responding to Exogenous Shocks by Going Virtual	2023	The authors use quantitative analysis methods to collect data and identify factors that affect organizational resilience.	This article reviews the relationship between organizational power and digital resources in controlling external impacts
(Behrendt et al., 2023)	Feasibility and Efficacy of a Digital Resilience Training: A Pilot Study of the Strengths-Based Training RESIST	2023	The authors used a pilot study method to collect data and identify factors that affect digital resilience.	This article reviews the abilities and effectiveness of digital resilience training, referred to as "RESIST".
(Lin & Tao, 2024)	Digital Resilience: A Multiple Case Study of Taobao Village in Rural China	2024	The author uses the multiple case method	The content of the article is about digital resilience in Taobao village in China. and identify factors that affect digital resilience.
(Tim & Leidner, 2023)	Digital Resilience: A Conceptual Framework for Information Systems Research	2023	Systematic literature	In the article, it is explained about the importance of <i>digital resilience</i> . Technology is an important thing in

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Author	Heading	Year	Method	Fill
(Sharma et al., 2022)	Digital Resilience Mediates Healthy Use of Technology	2022		daily life until the article mentions the importance of increasing research on the topic of <i>digital resilience</i> . The authors emphasize that excessive use of digital technology can lead to unhealthy digital behaviors, such as cyberbullying, digital burnout, webinar fatigue, and doom surfing. They also explain that digital failures can cause significant mental stress and can affect an individual's mental health.
(Reynolds & Parker, 2018)	Digital Resilience: Stronger Citizens Online	2018	The method used in the "Digital Resilience" project involves the use of education that focuses on digital, safe, and constructive skills.	This article discusses the "Digital Resilience" project conducted by the Institute for Strategic Dialogue (ISD) in the Netherlands. The project aims to improve the digital capabilities of Dutch society, especially among adolescents and young people, in dealing with and coping with negative experiences that occur online.

Discussion

This study systematically reviewed the literature on digital resilience, focusing on its implications for adolescent well-being, education, and strategies for mitigating negative online experiences. From an initial pool of diverse sources, we identified 16 key studies published between 2001 and 2024, reflecting a growing interest in understanding digital resilience as both a protective mechanism and a tool for promoting healthier digital behaviors. The discussion highlights the implications of these findings, limitations in the current literature and areas for future research.

Emerging Insights into Digital Resilience

Digital resilience has increasingly been recognized as a critical skill for navigating the risks and opportunities of the online world. According to (Pan et al., 2024), while digital spaces offer opportunities for adolescents to engage in knowledge-sharing and innovation, they also pose risks to their well-being. Pan's study emphasizes the role of environmental support- particularly from parents, educators, and school-level literacy programs- in preventing cyberbullying and fostering digital resilience. These findings align with (Sharma et al., 2022), who stress the importance of community involvement in promoting awareness and education to prevent unhealthy digital behavior and encourage balanced technology use.

(Hammond & Cooper, 2015) further elaborate on the discursive psychological aspects of digital resilience, criticizing the dominant top-down epistemologies of cyber protection. They argue that such approaches inhibit strengths-based practices, which could better equip adolescents to actively engage with and overcome digital challenges. This strength-based approach finds support in (A. Y. Lee & Hancock, 2023) research which demonstrates that students with digital resilience are not only more adept at evaluating online information but also more inclined to offer and seek support for online challenges.

Despite theoretical advances in understanding digital resilience, there is still a need for robust empirical evidence to support its implementation. Studies like those by (Reynolds & Parker, 2018) showcase practical initiatives, such as the "Digital Resilience" project in the Netherlands, which equips individuals with the skills to manage negative online experiences. However, these projects remain under-documented in terms of their long-term impact and scalability. Moreover, the relationship between digital resilience and broader psychosocial outcomes, such as mental health and academic performance, requires further exploration.

Limitations and Future Directions

This review has several limitations. First, while it systematically identified key studies on digital resilience, it may not capture all relevant research due to the evolving nature of the field. For example, recent studies exploring the effects of post-pandemic digital behavior patterns were excluded due to publication timelines. Furthermore, the studies reviewed vary widely in their definitions of digital resilience and their methods of measuring outcomes, highlighting the need for standardized metrics and longitudinal research.

Future research should focus on developing and validating interventions that incorporate digital resilience into formal education, community programs, and parental guidance. Additionally, understanding the intersection of digital resilience with other psychosocial constructs, such as emotional regulation and social connectedness, could provide a more holistic perspective on its benefits. Finally, the role of cultural contexts in shaping digital resilience strategies remains an underexplored area that warrants attention.

Conclusion

This study underscores the critical importance of digital resilience as an effective protective mechanism for addressing the challenges of the digital world, particularly for adolescents. As a vital skill, digital resilience not only empowers individuals to manage risks such as cyberbullying but also fosters healthier digital behaviors through environmental support, literacy programs, and strength-based approaches. Despite significant theoretical advancements, challenges such as the lack of empirical evidence, inconsistent definitions, and limited documentation of long-term impacts highlight the need for further research. Integrating digital resilience into formal education, community programs, and parental guidance is essential for cultivating holistic resilience that positively impacts mental health and academic achievement.

Additionally, the study emphasizes the role of cultural contexts in shaping effective digital resilience strategies, creating opportunities for in-depth research to develop standardized, sustainable global solutions. Moving forward, comprehensive digital resilience interventions should be prioritized to proactively address the negative impacts of technology.

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