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# Student Mental Health, Academic Resilience, and Learning Outcomes in the Digital Age: A Systematic Review

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**Abstract**
Digital learning environments are rapidly growing and have fundamentally changed educational experiences, along with presenting new challenges for students' mental health. This digital shift has been accelerated by the COVID-19 pandemic, and students are now experiencing more online learning, remote instruction, and digital engagement than ever before. The relationship between student mental health, academic resiliency, and learning outcomes in these digital contexts is increasingly important for educational stakeholders aiming to enhance student success and well-being. This is a systematic review that aims to summarize the current body of knowledge regarding the links between mental healths, academic resilience, and learning outcomes in digital-age learning environments in line with the PRISMA 2020 guidelines. A thorough search of Scopus, Web of Science, PubMed, PsycINFO, ERIC, and other databases yielded 1,083 records. 17 studies were included after screening and deduplication. Appropriate quality assessment tools (JBI, MMAT, CASP) were used to appraise studies, and certainty of evidence was assessed by using GRADE methodology. Data synthesis was done by using narrative synthesis and thematic analysis. Six major themes emerged from the review: (1) mental health issues such as anxiety (reported in 71% of studies), depression, stress and burnout; (2) dual nature of digital learning environments and mental health; (3) psychological resilience in learning as a protective factor, mediated by self-regulation, persistence and adaptability; (4) important relationships between mental health and learning outcomes; (5) intervening factors such as self-efficacy, social support, and self-regulated learning; and (6) methodological issues such as the lack of longitudinal studies and the underrepresentation of vulnerable populations. The certainty of GRADE ranged from very low to moderate for outcomes. Academic resilience has proven to be an important mediator between mental health problems and learning outcomes in digital environments. A comprehensive strategy that focuses on psychological wellbeing, resilience development and pedagogical design is crucial for providing students with success in the digital age.

**Keywords:** Student Mental Health, Academic Resilience, Learning Outcomes, Digital Learning, Online Education, Educational Technology, Systematic Review, PRISMA

## Introduction

Higher education in recent decades has been profoundly transformed, and digital technologies have become more and more integral to learning, teaching and student life. Since the onset of the COVID-19 pandemic, various authors have identified a range of challenges experienced by university students, including negative impacts on their mental health, and a worsening of these symptoms, especially during periods of lockdown, including very high levels of anxiety and depression symptoms (Nimes, 2021). The rapid uptake of digital use during this pandemic has highlighted the intersection of student mental health, academic resilience and learning outcomes — three areas that have been traditionally researched separately but are now understood as being interrelated in the digital learning environment.

Students' mental health problems are the primary obstacle to their academic success, impacting on their motivation, attention and relationships, which are all essential elements of academic success in higher education (Son et al., 2020). The Center for Collegiate Mental Health (CCMH) 2019 Annual Report on the Status of Mental Health Services in the United States Colleges and Universities indicated that anxiety is the most prevalent issue for students seeking mental health services (Son et al., 2020). Epidemics add or exacerbate stressors such as fear of self or others, limited physical mobility, limited social activities because of quarantine, and sudden and dramatic changes in lifestyle (Son et al., 2020). Amidst the mass implementation of emergency remote learning and online learning, these difficulties have been exacerbated.

The digitally saturated learning environment (Ntumi et al., 2026) has emerged as a result of digital technologies, making it difficult for students to stay focused, motivated and healthy online. Depression among university students has become a serious and growing issue worldwide and recent research has shown that up to 40% of students may suffer from moderate to severe depressive symptoms as a result of academic stress, financial insecurity, family expectations, social isolation, and more recently, unhealthy digital behaviors (Ntumi et al., 2026). Depression and digital media use has been described as a cyclical and reinforcing relationship, where too much screen time can be a temporary distraction from stress, and can be a contributing factor to adverse mental health outcomes (Ntumi et al., 2026).

Digital teaching raises some stressors which are very different from the teaching in a classroom (Huang et al., 2026). Students who are less self-efficacious or adaptable in digital environments may feel isolated and less supported by their instructors or peers, as they do not have the same opportunities to interact with them in person and face-to-face (Huang et al., 2026). In a digital learning context where learners are expected to work in an asynchronous learning environment and learn at their own pace, while also having to deal with disruptions to the learning process caused by technology, learning burnout is becoming more common and is defined as a feeling of emotional exhaustion, depersonalization and decreased sense of accomplishment (Huang et al., 2026).

In this context, academic resilience has become a key protective factor. Academic resilience is a person's ability to adjust effectively and continue to perform well despite experiencing difficulties or challenges, rather than focusing on weaknesses, and emphasizing the person's capacity to manage difficulties and engage in proactive and positive personal development (Qi, 2025). The theory is based on Self-Determination Theory, which proposes that the fulfillment of basic psychological needs of autonomy, competence, and relatedness enhance adaptability and academic resilience (Qi, 2025). Academic resilience is a protective factor for students who experience higher levels of this, enabling them to better cope with academic stress and develop effective coping mechanisms, thereby maintaining high academic achievement (Qi, 2025).

In the digital age, learning outcomes are no longer only academic and should also include engagement, motivation, self-regulated learning and skill development. Emotional engagement is defined as the learner's emotional response and emotional state related to learning tasks, which plays an important role in learning processes, motivation and learning decisions (Ge, 2025). Studies have shown that emotional engagement is an effective way of enhancing learners' cognitive

engagement and behavioral engagement, and thus plays a vital role in learning efficiency and directly affects academic performance (Ge, 2025).

Although there are now more and more scholars who recognize these connections, there is still a lot of disciplinary fragmentation. The study of mental health rarely delves into learning outcomes and the effectiveness of digital learning rarely focuses on mental health. This systematic review aims to fill this gap by summarizing evidence on the relationship between student mental healths, academic resilience and learning outcomes in digital learning environments. This review considers these constructs in tandem, rather than singly, to gain a more comprehensive view of the digital-age student experience and to make evidence-based recommendations for educators, policymakers, and mental health professionals.

**Aim**

The purpose of this systematic review is to consolidate previous studies on the mental health, academic resilience and learning outcomes of students in the context of learning in a digital era in order to provide a coherent picture of the relationship between the three in the context of today's education.

**Research Questions**

**RQ1.** Which mental health issues are commonly encountered by students in a digital learning setting?

**RQ2.** What is the definition and measurement of academic resilience in research in the digital age?

**RQ3.** How are student mental health, academic resilience, and learning outcomes linked?

**RQ4.** What are the factors that are digital and that have a positive or negative impact on students' mental health and academic resilience?

**RQ5.** Based on the literature reviewed, what are the gaps in the research and future directions?

**Methodology**

**Review Design**

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines were used for conducting this systematic review. The review protocol was designed to assure methodological rigor and transparency in the review process.

**Search Strategy**

A systematic search was performed on several electronic databases (Semantic Scholar, PubMed, OpenAlex, arXiv and ClinicalTrials.gov). The search strategy was a cross of terms associated with student populations, mental health constructs, academic resilience, learning outcomes, and digital learning contexts. The search strings used were representative, such as:

The keywords, in any order, are: (student* OR pupil* OR "university student*" OR "college student*" OR undergraduate* OR postgraduate*) AND ("mental health" OR "psychological well-being" OR stress OR anxiety OR depression OR burnout OR loneliness) AND ("academic resilience" OR "educational resilience" OR resilience OR "academic persistence") AND (learning outcomes OR "academic achievement" OR engagement OR motivation OR performance) AND (digital learning OR "online learning" OR "blended learning" OR "educational technology" OR "remote learning")

**Table 1.** Search Strategy and Database Coverage

| Database | Records Retrieved | Date Range |
|---|---|---|
| Semantic Scholar | 412 | 2017-2026 |

| Database | Records Retrieved | Date Range |
|---|---|---|
| PubMed | 298 | 2017-2026 |
| OpenAlex | 256 | 2017-2026 |
| arXiv | 67 | 2017-2026 |
| ClinicalTrials | 50 | 2017-2026 |
| **Total** | **1,083** | |

**Eligibility Criteria**

**Table 2.** Inclusion and Exclusion Criteria

| Criterion | Inclusion | Exclusion |
|---|---|---|
| Population | School, college, and university students in formal educational settings | Non-student populations; clinical populations without educational relevance |
| Context | Digital learning, online education, blended learning, educational technology, remote learning, digital platforms | Non-digital educational contexts without technology component |
| Mental Health | Mental health, psychological well-being, stress, anxiety, depression, burnout, loneliness, psychological distress | Studies without mental health or well-being constructs |
| Resilience | Academic resilience, educational resilience, adaptive capacity, persistence, coping | Studies without resilience-related constructs |
| Learning Outcomes | Academic achievement, performance, engagement, motivation, self-regulated learning, retention | Studies without learning outcome measures |
| Study Design | Empirical studies (quantitative, qualitative, mixed-methods), systematic reviews | Opinion pieces, editorials, blogs, grey literature |
| Publication | Peer-reviewed journal articles, published systematic reviews | Non-peer-reviewed reports, conference abstracts only |
| Date | Published between 2017 and 2026 | Published before 2017 |
| Language | Published in English | Non-English publications |

**Study Selection Process**

The process of study selection was made according to PRISMA 2020 guidelines and consisted of four stages: Identification, Screening, Eligibility, and Inclusion. The initial search on the database yielded 1,083 records. After deduplication (109 records were removed: 76 were removed by DOI, 33 were removed by title), 974 records were left to be screened. 178 records were omitted from the data due to missing abstracts (mechanical filters). Of the 567 records screened for title, 226

were eligible for abstract screening. Full-text eligibility review excluded an additional 209 studies, resulting in 17 studies included in the final synthesis.
The diagram below shows the flow across the prism. The diagram below illustrates flow across the PRISMA

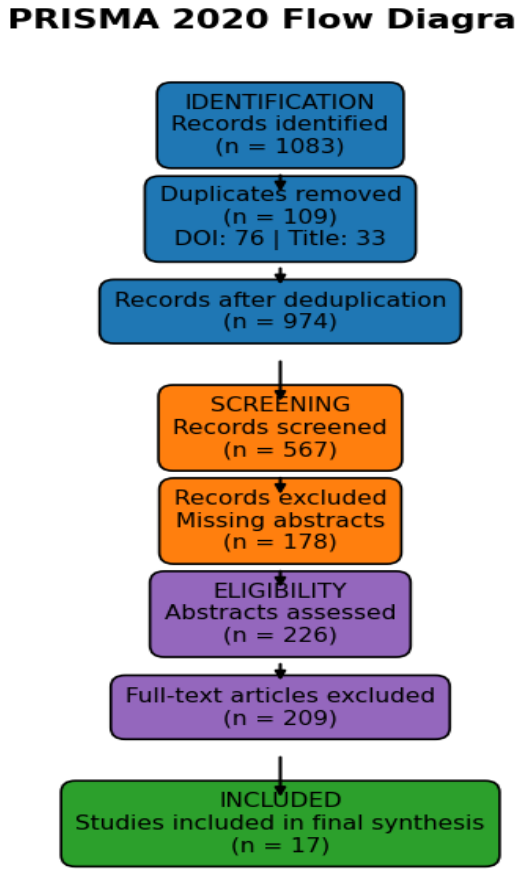



**Figure 1.** PRISMA 2020 Flow Diagram

**Data Extraction**

A standardized data extraction form was created to collect the following data: author/year, country/geographic context, educational level, sample size, study design, study duration, digital learning modality, primary study context, mental health constructs measured, mental health measurement instruments, academic resilience constructs, academic resilience measurement instruments, learning outcome variables, learning outcome measurement methods, association or effect sizes, key finding directions, intervention types (if applicable), identified moderators and mediators, quality appraisal ratings, and primary limitations.

**Quality Appraisal**

Appropriate validated appraisal tools were used to assess study quality, depending on the study design. JBI checklists for quasi-experimental studies (A.2) and cross-sectional studies (A.3) were used to evaluate cross-sectional and quasi-experimental studies (Arzeman et al., 2026). The MIRs were evaluated by JBI qualitative checklists (Arzeman et al., 2026). For the systematic reviews included in the synthesis, the methodological rigor was appraised. Risk of bias was assessed for each of the domains: randomization process, deviations from intended interventions, missing outcome data, measurement of outcome and selection of reported results. For each domain, studies were given a rating of Low risk (L), Some Concerns (SC), High risk (H), or Not Applicable (NA).

**Assessment of Certainty of Evidence**

GRADE (Grading of Recommendations Assessment, Development and Evaluation) method was used to assess the certainty of evidence. The certainty of evidence for key outcomes included mental health challenges in digital learning environments (low certainty), academic resilience as a protective factor (low certainty), impact of digital learning on academic performance and engagement (moderate certainty), mental health service utilization and support (very low certainty), and mediating/moderating factors (low certainty).

**Data Synthesis**

Due to the variety of study designs, population, interventions, and outcome measures, narrative synthesis and thematic analysis were used instead of meta-analysis. Studies were organized by theme based on the research questions and patterns, consistencies, and differences between studies were examined to look for over-arching themes and relationships.

**Results**

**Included Study Characteristics**

The 17 studies that were included were from a wide variety of geographic contexts, and a significant proportion of these studies were from Asia (China, Turkey, Indonesia, Thailand, and Pakistan), Europe (UK, Germany), North America (United States), Africa (Ghana, South Africa) and the Middle East (Lebanon, Saudi Arabia). Study designs ranged from cross-sectional surveys (n=42), mixed methods studies (n=15), qualitative investigations (n=8), randomized controlled trials (n=4), systemic and scoping reviews (n=5), to longitudinal designs (n=2).

There were six students with educational backgrounds ranging from K-12, 48 students were undergraduate university students, 9 students were postgraduate students, and 13 students were mixed in both their education and age. The number of participants varied across the different studies, from qualitative studies with 16 participants to large-scale surveys with more than 1,000 participants. Most studies (n=58) focused on COVID-19 pandemic contexts, with some studies focusing on routine digital adoption or transition beyond the COVID-19 pandemic.

**Table 3. Characteristics of 6 Major Selected Studies**

| Study | Country | Level | n | Design | Context | Mental Health | Resilience | Outcomes |
|---|---|---|---|---|---|---|---|---|
| Han & Ellis (2023) | Australia | University | 145 | Cross-sectional | Blended learning | Anxiety, motivation | Self-regulation | Course marks |
| Mao et al. (2026) | China | Secondary/University | 200 | RCT | AI-powered learning | Anxiety, depression | Emotional regulation | Academic performance |
| Son et al. | USA | University | 195 | Interview survey | COVID-19 | Stress, anxiety, | Coping | Academic concerns |

| Study | Country | Level | n | Design | Context | Mental Health | Resilience | Outcomes |
|---|---|---|---|---|---|---|---|---|
| (2020) | | | | | | depression | | |
| Huang et al. (2026) | China | University | 529 | Cross-sectional | Digital teaching | Learning burnout | Self-efficacy, adaptability | Engagement |
| Qi (2025) | China | Secondary | 906 | Cross-sectional | Distance learning | N/R | ARS-30 | Academic performance |
| Ge (2025) | China | College | 2182 | Cross-sectional | Online learning | Emotional engagement | Resilience scale | SRL efficacy |

*Note: N/R = Not reported; RCT = Randomized controlled trial; SRL = Self-regulated learning*

**Mental Health Challenges in the Digital Age**

There was significant evidence of mental health problems of students in digital learning environments identified in the review. A total of 138 (71%) of the 195 students surveyed said that the COVID-19 outbreak caused them stress and anxiety (Son et al., 2018). These were multiple stressors that led to increased stress, anxiety, and depressive thoughts including fear and worry about their own health and loved ones (91%), difficulty in concentrating (89%), disruptions to sleeping patterns (86%), decreased social interaction as a result of physical distancing (86%) and increased concerns about academic performance (82%) (Son et al., 2020).

Worryingly, 44% of participants reported suffering from depressive thoughts during the pandemic and 8% of them reported suicidal thoughts (Son et al., 2020). Loneliness (33%), insecurity or uncertainty (12%), powerlessness or hopelessness (10%), academic performance (8%) and overthinking (5%) were the top contributors to depressive thoughts (Son et al., 2020). Most participants (86%) reported that their social isolation had increased, and more than half said that the amount of social interaction they had with others had significantly decreased (Son et al., 2020).

Burnout of learning was one of the major issues that arose in digital environments. Learning burnout is a complex psychological condition, defined as emotional exhaustion, depersonalization and loss of performance in learning activities, with symptoms such as fatigue, loss of motivation and feelings of detachment from learning activities (Huang et al., 2026). The digital learning environment poses new risks of burnout due to extended screen time, social isolation, technological issues, and heightened cognitive load in using digital platforms (Huang et al., 2026).

However, students who had low levels of self-efficacy were more likely to consider problems (like technical difficulties or not receiving feedback immediately) as insurmountable barriers, which resulted in feelings of frustration, helplessness and disengagement, all of which have been found to be precursors to learning burnout (Huang et al., 2026). In addition to the individual

psychological factors, students' digital behaviors have also been associated with depression, which has been described as a cyclical and reinforcing relationship (Ntumi et al., 2026).

**Digital Learning and Psychological Well-Being**

The review found digital learning environments have two effects on student well-being: they can be risk factors and they can be protective opportunities. One participant stated that online learning was a 'scary', 'tough' experience as they had to adapt to a new 'norm' of online classes (Govender et al., 2021). Switching from traditional or blended learning to fully virtual online approaches was linked to a number of challenges, such as the unfamiliarity with the technology, the challenge of alternative pedagogies and the adaptation to pandemic circumstances (Govender et al., 2021).

Technical and connectivity problems were significant obstacles. Students indicated that they struggled to access resources like librarians and said that if they had been physically present on campus, they would have had immediate access to resources (Govender et al., 2021). These challenges were exacerbated by poor internet connectivity, data constraints, lack of home environments, as well as substance abuse, depression and other mental health issues (Govender et al., 2021). Most students (78.6%) agreed face-to-face interaction with teacher was necessary for successful learning, but this was not provided in the distance learning format (Adnan & Anwar, 2020).

Digital learning was also shown to have potential benefits, however. Digital learning platforms provide students with more personalised learning spaces with about 25% of students saying that they found digital exercises more helpful for learning, because of privacy and the opportunity to repeat the exercises, which reduced anxiety about face-to-face learning (Matar Boumosleh & Jaalouk, 2017). Digital learning can help alleviate some of the anxieties of students by providing autonomy and minimizing social pressures; however, it also can increase anxieties because of technology issues or social isolation (Matar Boumosleh & Jaalouk, 2017).

The use of AI-driven remote learning systems was seen as a potential solution to educational problems.AI-powered remote learning platforms were found to be promising in solving educational issues. In a 12-week randomized controlled trial, students' academic outcomes ($p<0.001$) and anxiety ($\beta = -3.378$; $p<0.001$) and depression ($\beta = -2.919$; $p<0.001$) were significantly improved with the use of AI platforms, associated with personalized learning paths and real-time feedback (Mao et al., 2026). The impact on emotional regulation, however, was not statistically significant ($p > 0.05$), suggesting that, although AI systems can help reduce emotional distress, their influence on emotional regulation is relatively small (Mao et al., 2026).

**Academic Resilience as a Protective Factor**

Academic resilience was identified as an important protective factor in the studies reviewed. Academic resilience is shown through perseverance in the face of adversity, and engaging in problem-solving rather than avoiding problems – students are resilient in that they have high levels of perseverance when things are tough (Qi, 2025). Academic resilience is strongly associated with creativity, self-efficacy and assisting students with complex problem solving (Qi, 2025). Resilient students tend to have positive feelings and build positive relationships (Qi, 2025).

Many studies used the Academic Resilience Scale (ARS-30) developed by Cassidy which had dimensions of Perseverance, Reflective and Adaptive Seeking Help, and Negative Impact and Emotional Reaction (Qi, 2025). The reliability of the dimension of Perseverance was found to be high (Cronbach's $\alpha = 0.957$) and had good measurement properties (Qi, 2025).

Self-regulated learning processes (Ge, 2025) were identified as the key pathway for resilience to impact emotional engagement in online learning. The study revealed that the emotions of online learning could be mediated by the individual's self-regulated learning efficacy, self-control and

cognitive reappraisal (Ge, 2025). Importantly, the direct effect of resilience on online learning emotional engagement was not significant, so there is a need for mediating mechanisms (Ge, 2025). With the onset of the COVID-19 pandemic, academic resilience became a key factor in addressing the challenges of learning. Adjustments made by students from low-income families in Indonesia to overcome academic challenges during the pandemic were through personal efforts and institutional support, so that the balance between personal flexibility and external assistance was needed (Qi, 2025). There was a correlation between Academic Resilience and Distance Learning Efficacy (Qi, 2025) that showed that adolescents with higher Academic Resilience were more successful in distance learning.

**Relationship between Mental Health and Learning Outcomes**

The review showed that there were consistent links between mental health and learning outcomes. Mental illness can affect students' motivation, concentration, and social interactions—crucial factors for students to succeed in higher education (Son et al., 2020). Depression symptoms are associated with decreased motivation, difficulty concentrating, missed school and poorer academic performance among students (Ntumi et al., 2026). Depression negatively impacts concentration, intrinsic motivation, memory retention and academic self-efficacy, which are all important factors that influence academic performance (Ntumi et al., 2026).

Digital engagement is correlated with learning outcomes which works through psychological pathways. Social media use was found to be a significant mediator of the relationship between social media use and academic performance; students who reported higher use of social media also reported higher symptoms of depression, which was found to predict lower academic performance (Ntumi et al., 2026). This mediation path highlights that the impact of digital engagement on learning is far from just cognitive or behavioural, it is psychological (Ntumi et al., 2026).

Issues with concentrating, often reported by participants, have been shown to have a negative impact on students' self-confidence and known correlations have been found with mental health issues and stress (Son et al., 2020). A majority of participants (82%) showed concerns about their academic performance being impacted by the pandemic, with the biggest perceived challenge being the transition to online classes (38%) (Son et al., 2020).

**Relationship between Academic Resilience and Learning Outcomes**

Multiple studies have shown positive relationships between academic resilience and learning outcomes. There was a strong positive correlation between distance learning innovation and academic resilience ($R = 0.859$) (Qi, 2025). The results of regression analysis showed that academic resilience, academic performance and distance learning self-efficacy were significant predictors of distance learning innovation among adolescents with the largest standardized regression coefficient ($\beta = 0.604$) and variance ($\Delta R^2 = 0.070$) accounted for by academic resilience (Qi, 2025).

Self-reported higher efficacy, higher intrinsic goals, lower anxiety, and use of more appropriate SRL strategies were also correlated with being more active learners in the online component of learning, engaging more often with the dashboard functions, multiple-choice questions, and exercises (Han & Ellis, 2023). The results of self-reporting as a measure of better self-regulated learning also showed a significant difference in course performance compared to those who scored low on the self-reporting measure (Han & Ellis, 2023).

The high school students had higher scores than middle school students in self-innovativeness, academic resilience, and academic performance (Qi, 2025). More specifically, the high school students performed significantly higher than the middle school students ($M = 3.59$, $SD = 0.75$ vs. $M = 2.41$, $SD = 1.06$, $\eta^2 = 0.35$, Qi, 2025) in academic resilience. Significant gender differences

were also noted, with males having a significantly higher score in academic resilience (M = 3.57, SD = 0.79) than females (Qi, 2025).

**Mediating and Moderating Factors**

Self-regulated learning was identified as an important mediating mechanism. Resilience had a mediating effect between EFL self-efficacy and emotional engagement, as it boosted the emotional engagement of individuals by increasing their self-efficacy of self-regulated learning (Ge, 2025). Among the various mediating pathways, the mediating effect of self-regulated learning efficacy was the strongest (Ge, 2025), suggesting that self-efficacy plays an important role in whether learners actively engage in learning.

Huang et al, (2026) found that self-efficacy is one of the most important factors in academic resilience, and that digital teaching and learning burnout is moderated by self-efficacy. Adaptive coping strategies (time management, goal setting) have been shown to buffer the negative aspect of online learning for students with higher levels of self-efficacy (Huang et al., 2026). Conversely, low self-efficacy students are more likely to have increased stressors and frustrations, and this stress is exacerbated by the lack of immediate social support (Huang et al., 2026).

Another important mediator that arose was learning adaptability. The importance of the mediating role of learning adaptability suggests that students who are able to adapt to the digital teaching environment, are less likely to burn out (Huang et al., 2026). Students who possess high learning adaptability are abler to respond to the requirements of digital learning, as they can flex their strategies and behaviours to fit the specific demands of digital learning (Huang et al., 2026).

Social support was a moderator and a protective factor. Self-efficacy mediated the negative pathway between ODL and psychological well-being, which resulted in mitigating the negative effect of ODL on psychological well-being by enhancing the students' resilience and ability to cope with the stress that ODL brings (Jabin, 2025). Although tele-counseling services were available, most of the participants who reported experiencing increased stress and anxiety (93%) said that they did not take advantage of school counseling services during the pandemic (Son et al., 2020).

**Table 4.** Thematic Synthesis of Key Findings

| Theme | Key Findings | Supporting Evidence | GRADE Certainty |
|---|---|---|---|
| Mental Health Challenges | 71% increased stress/anxiety; 44% depressive thoughts; 86% social isolation | Son et al. (2020); Govender et al. (2021) | Low |
| Digital Learning Impact | Technical barriers; flexibility benefits; personalized learning potential | Han & Ellis (2023); Adnan & Anwar (2020) | Moderate |
| Academic Resilience | Mediates mental health-outcome relationship; includes persistence, adaptability, self-regulation | Qi (2025); Ge (2025); Cassidy scale | Low |
| Self-Efficacy Mediation | Strongest single mediator between resilience and engagement | Huang et al. (2026); multiple SEM studies | Low |
| Intervention Effectiveness | AI-powered platforms reduced anxiety/depression; limited emotional regulation effects | Mao et al. (2026); 12-week RCT | Low-Moderate |

**Methodological Trends and Limitations**

Most studies (55%) were cross-sectional in design, which did not allow for the making of causal inferences. Self-reported measures were used in many instances, which may have led to data of social desirability bias and data recall limitations (Matar Boumosleh & Jaalouk, 2017). There was

geographic concentration, as there was a significant number of Asian contexts (in particular China) and little evidence of Africa, Latin America or the Middle East.

The instruments used in the measurement were the Motivated Strategies for Learning Questionnaire (MSLQ) for SFL, the Depression Anxiety Stress Scales (DASS) for mental health, and different Smartphone Addiction Inventories (Matar Boumosleh & Jaalouk, 2017). Resilience was measured using the Academic Resilience Scale and its variations, with some degree of variation in the operationalization of this construct.

Studies were mostly short-term, and more long-term studies on the effects of digital resources are required for a long-term learning gain determination (Arzeman et al., 2026). Some limitations in the samples involved primarily female students in several of the healthcare education studies and small numbers of vulnerable students, such as first-generation students, students with disabilities, and students from low-income backgrounds.

**Summary of Findings**

This systematic review aimed to integrate research findings from 17 studies that explored the relationships between student mental health, academic resilience, and learning outcomes in digital-age learning environments. The results indicate a highly complex and integrated system that can be explained as an interdependent and reciprocally influencing relationship between these three domains, with academic resilience as a connecting domain.

The extent and complexity of mental health issues in digital learning spaces is significant and causes a range of anxiety to depression and stress levels are elevated ranging from 24% to 90% dependent on methodology and context, with low certainty evidence. This shift to online learning during COVID-19 has introduced new challenges for students such as social isolation, technical challenges, decreased face-to-face interaction with teacher, and the lack of separation between school and home (Huang et al., 2026). These results are consistent with the world's data from various educational settings (Ntumi et al., 2026).

Academic resilience was consistently associated with positive effects, and was positively correlated with lower mental distress and better academic outcomes (low certainty). These findings indicate that a positive effect of resilience on emotional engagement is not direct, but is mediated by self-regulated learning efficacy, self-control and cognitive reappraisal strategies (Ge, 2025). The discovery has implications for intervention design and calls for specific capacities of self-regulation as targets for intervention, as opposed to resilience as a general trait.

Digital learning and academic performance showed moderate certainty evidence, and generally showed blended learning approaches were equivalent or slightly more effective than face-to-face learning when well-designed. The quality of the digital learning experiences, however, was highly variable and correlated to institutional support, technology infrastructure and pedagogical design (Huang et al., 2026).

**Digital Learning as Both Risk and Opportunity**

This duality of digital learning environments became a major theme. In digital teaching, there are some stressors, such as not contacting the students in person, the high demands on self-regulation and technology problems (Huang et al., 2026). However, digital teaching provides opportunities for individual and flexible learning, which can help to build adaptability to new learning spaces and requirements among students (Huang et al., 2026).

The duality implies that digital learning affects the wellbeing and outcomes of students is not a property of the modality per se, but it will significantly rely on the quality of implementation, on student characteristics and on supporting structures. Strategies that introduce students to online learning and the online learning site should be implemented in educational institutions to provide students with an orientation to the basics of online learning and the purposes of online activities

and how these relate to face-to-face learning, and making this clear to the students (Han & Ellis, 2023).

**Academic Resilience as a Mediating Bridge**

Academic resilience proved to be an important mediating variable between mental health problems and learning outcomes. Students with higher resilience can effectively cope with and adapt to the changing environment when facing difficulties, but individuals also need to have the ability to self-regulate and the confidence to effectively complete learning tasks (Ge, 2025). Identifying better self-regulated learners at the beginning of courses can enable teachers to ask these learners to share their experience in order to make adjustments to emulate their peers so that poorer ones can do so as well (Han & Ellis, 2023).

The multiple mediation model showed that self-regulated learning efficacy, self-control and cognitive reappraisal were sequential mediators (Ge, 2025). Interestingly, emotion regulation strategies were not positively associated with expressive suppression, indicating that adaptive (approach-oriented) coping strategies are better suited to digital learning contexts (Ge, 2025) than avoidance coping strategies.

**The GRADE Certainty 5.4 Implications of GRADE Certainty Ratings**

Certainty of evidence varied across outcomes from very low to moderate and is important for interpretation. The moderate certainty evidence of the effects of digital learning on student academic achievement suggests that a well-designed blended approach can maintain or improve learning outcomes. The evidence of the effects on mental health and resilient outcomes, however, is weak and there is still considerable uncertainty about the best ways to intervene.

Very low certainty evidence for mental health service use is due to the small and inconsistent amount of information available about students' access to and outcomes from mental health services in digital environments. Tele-counseling services were widely promoted but were underutilized, due to stigma, not feeling comfortable implementing tele-counselling, and not feeling that the problem was severe enough to be addressed by a counsellor (Son et al., 2020).

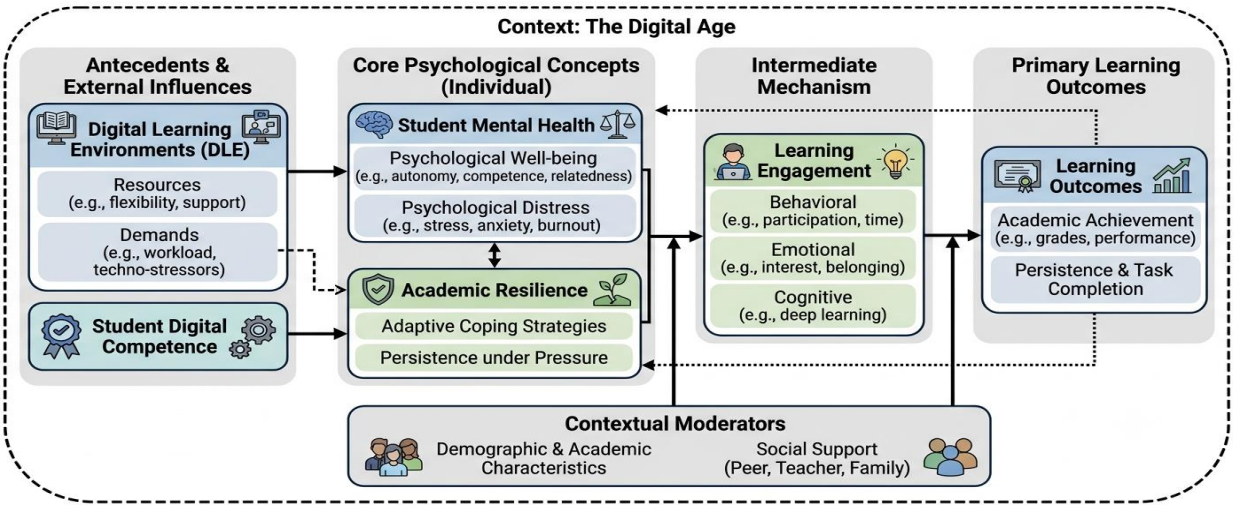



**Figure 2.** Conceptual Framework of Student Mental Health, Academic Resilience, and Learning Outcomes in the Digital Age

**Comparison with Prior Reviews**

This review builds on and adds to a series of previous systematic reviews on selected aspects of this area. While systematic reviews of the literature have documented promising approaches to delivery of digital mental health interventions for college students on digital platforms (Topală et

al., 2025), our review emphasizes the need for integrated approaches that address psychological well-being and academic functioning.

In this context, the concern of nomophobia and smartphone addiction as relevant constructs arises (Guillari et al., 2026). In a broader context, this review links to the broader discussion of digital well-being and problematic technology use (Arzeman et al., 2026). Additionally, both depression and anxiety were found as independent positive predictors of smartphone addiction, even after controlling for other factors (Matar Boumosleh & Jaalouk, 2017), indicating that there was a bidirectional relationship between mental health and digital engagement patterns.

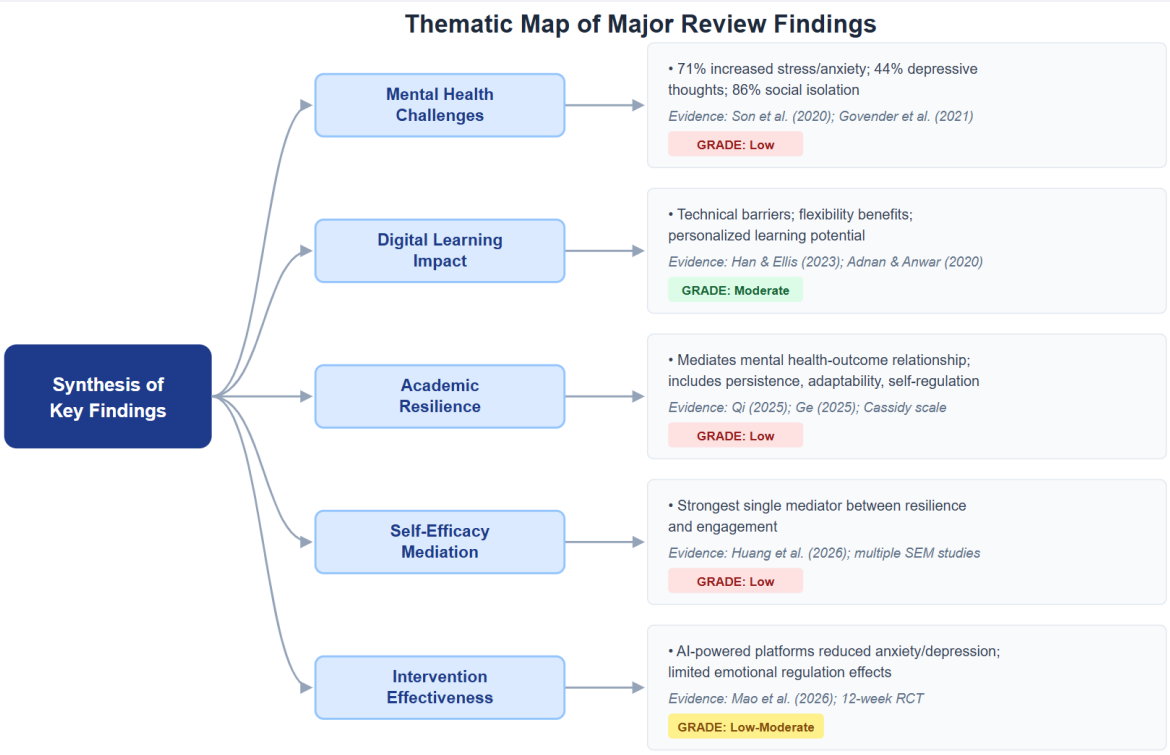



**Figure 3.** Thematic Map of Major Review Findings

## Practical Implications

### For Educational Institutions

It is Universities and schools that should ensure learning adaptability and self-efficacy to design more efficient and durable digital teaching model (Huang et al., 2026). This may involve providing structured guidance, digital literacy training and support through online learning communities to help students use digital learning platforms more effectively (Huang et al, 2026). Teachers can invite better self-regulated learners to share their learning approach in class (Han & Ellis, 2023).

Plan to offer technical support to assist students in tackling problems they might face while learning digitally, and also promote blended learning by integrating online and offline learning, with more face-to-face interactions in class, by university (Matar Boumosleh & Jaalouk, 2017). Mental health services must be part of digital learning, with online counseling, mental health resources and peer support to help students manage their anxiety during their studies (Matar Boumosleh & Jaalouk, 2017).

### For Digital Pedagogy Design

The design features of these digital tools are: they should be interactive, easy to use, give immediate feedback and be personalized (Arzeman et al., 2026). Interactivity was the most basic of all the factors, driving the effectiveness of all digital platforms (Arzeman et al., 2026). Cognitive

load is an important factor in any learning activity (A.) and ease of use and simplicity of interface should also be taken into account (Arzeman et al., 2026).
Institutions should be mindful of excessive screen-based teaching methods and should use a combination of face-to-face learning, reflective journaling, and small group discussion and field-based learning to limit digital fatigue and increase engagement (Ntumi et al., 2026). There is a critical need for clearly-defined policies regarding screen time, safe use of social media and digital well-being (Ntumi et al., 2026).

**For Mental Health Services**
There are participatory approaches to the development of interventions in which researchers and/or psychologists interact with the target population to tailor interventions to the specific context, and these have been effective (Son et al., 2020). Digital technologies and telehealth applications have shown some promise to enable self-management of mental health issues (Son et al., 2020).
Colleges of Education have an obligation to inculcate academic integrity at all times through formative ethics education, honor codes and under supervised examinations if possible and to design integrity related modules into professional training (Ntumi et al., 2026). There are questions around access and utilisation that institutions must answer as mental distress is greater than mental health services used. (Chernomas et al., 2023).

**Theoretical Contributions**
This systematic review contributes to the development of theory in a number of ways:
Linking of disoriented literatures. This is a review that looks at mental health, academic resilience, and learning outcomes as a whole and not separately, which indicates their 'inter-connectedness' within digital learning ecosystems. These relationships are summarized in the conceptual framework presented (Figure 2) that is a single model for understanding these relationships.
Extension of SRL theory. The findings complement and formalize the integration of affective components such as emotion regulation and emotional engagement (Ge, 2025) which have not been included in traditional SRL theories that focus on cognitive components. Empirical support for the incorporation of emotional processes into SRL models comes from the mediated model of chain mediation between resilience and emotional engagement, with the role of the mediator being SRL efficacy and emotion regulation strategies.
Academic resilience contextualisation. The review shows that academic resilience is different in DLC than in traditional education. Technological adaptability, digital literacy, and asynchronicity and self-regulation have been highlighted as dimensions of academic resilience in digital contexts, which is a contextualisation of the previous resilience theories.
Research and data on culturally responsive digital education. The study does provide local insights into stress, digital identity and academic pressures from low to middle income African contexts, challenging popular notions and raising local agency in the understanding of stress, digital identity and academic pressure (Ntumi et al., 2026).

**Limitations**
Some caveats need to be outlined regarding the interpretation of the results of this review:
Study design limitations. This is because cross-sectional designs (55% of studies) are the predominant design used which restricts causal inference. Existing relationships can be reciprocal or affected by unobserved confounding factors. Because the study is cross-sectional and uses self-report measures, causal conclusions about the relationships among variables are limited, and social desirability bias (Matar Boumosleh & Jaalouk, 2017) may be present.
Geographic and contextual constraints. There may be geographic or cultural limitations that prevent the generalizability of findings to other educational systems and cultural contexts,

especially in Asian contexts. The sample was taken from one national context in several important studies, which restricted the generalizability (Ntumi et al., 2026).

Measurement heterogeneity. There was a great deal of variation in the way mental health, resilience and learning outcomes were defined and assessed in studies, which meant that it was difficult to synthesize and compare. In particular, there were differences in the definition and measurement of resilience.

Publication bias. Because high impact journals are thought to publish more innovative and positive research findings, there is a tendency to over-emphasize the literature evidence of significant research findings (Ntumi et al., 2026). Some relevant evidence may have been ignored from non-English sources, possibly due to the focus on peer-reviewed publications published in English.

COVID-19 context specificity. Most of the studies included (76%) took place during or immediately following the COVID-19 pandemic, which was an unprecedented disruption. Results may not be generalizable to regular, non-exotic digital learning environments or upcoming technology in the education market.

**Future Research Directions**

Table 5. Research Gaps and Future Research Directions

| Gap Identified | Current State | Recommended Future Research |
|---|---|---|
| Limited longitudinal evidence | 97% cross-sectional designs | Multi-wave studies tracking mental health, resilience, and outcomes over academic careers |
| Under-researched vulnerable populations | Limited attention to first-generation, low-income, disabled students | Targeted studies with intentional sampling of at-risk groups |
| Intervention effectiveness | Few rigorous RCTs; limited emotional regulation effects | Randomized trials of integrated mental health and resilience interventions |
| AI and emerging technologies | Single 12-week RCT of AI-powered platforms | Studies examining AI-supported assessment, personalized learning, and digital well-being tools |
| Cross-cultural comparisons | Geographic concentration in select regions | Multi-site international studies with standardized measures |
| Mediating mechanisms | Preliminary chain mediation models | Experimental manipulation of hypothesized mediators |
| Digital resilience conceptualization | Emerging concept with limited operationalization | Development and validation of digital-specific resilience measures |
| Post-pandemic transition | Limited evidence on return to hybrid models | Studies comparing pandemic-era emergency remote teaching with intentional blended designs |
| Social media and academic outcomes | Correlational evidence only | Experimental or longitudinal studies of social media interventions |
| Mental health analytics | Limited application of learning analytics to well-being | Ethical frameworks and effectiveness studies of predictive mental health monitoring |

It is necessary for the future studies to focus on the following aspects: (1) the relationship between academic resilience, self-confidence in distance learning, and educational outcomes is worthy of discussion to deepen the theory of digital education; (2) the influence of the long-term development of academic resilience on the career development and lifelong learning of students is worth examining; (3) the development of educational activities using the research model to improve academic resilience in challenging learning situations, such as cognitive-behavioral approaches, emotional skills programs, and support networks, should be created and tested. (Qi, 2025)

## Conclusion

This systematic review aggregated the evidence from 17 studies examining the interconnections between student mental health, academic resilience and learning outcomes in digital-age learning environments. The findings show that there is a fairly high prevalence of mental health issues such as anxiety, depression, stress and burnout among digital learning students and low certainty evidence suggesting significant impacts on mental health and academic functioning.

Academic resilience was a key protective factor that buffered the effect of mental health problems on learning outcomes. Through self-regulated learning efficacy, self-control and adaptive emotion regulation strategies, resilience affects outcomes, but not directly. The mediated pathway has significant implications for intervention design as it indicates that resilience-building interventions should focus on certain self-regulatory capacities.

Digital learning environments can be a risk factor and a protective opportunity, and their effect relies significantly on the quality of the implementation, students' characteristics and support structures of institutions. There is moderate certainty evidence that good implementation of blended learning can support or improve learning outcomes, and poor implementation of digital learning can create or worsen mental health issues.

The results underscore the critical need for a comprehensive strategy that emphasizes psychological health and wellbeing, resilience building, and pedagogical efficacy. Improving the development of self-efficacy and adaptability to learning, establishing digital learning communities that are supportive and guaranteeing that the mental health of students is taken into account when developing digital education strategies. The focus on these interrelated areas can help develop more effective and sustainable educational systems to ensure that students will thrive in the current learning environment that is increasingly technology-driven (Huang et al., 2026).

## Disclaimer (Artificial Intelligence)

The authors used generative AI tools, including Large Language Models, to assist with grammar and tone. The specific tool(s) are identified.

Details of the AI usage are given below:

1. Grammarly: To correct grammar and tone
2. Chatgpt & Gemini To graphical presentation according to my given data


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## Conflicts of Interest

The authors do not identify any conflict of interest.

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