

Exploring Student Well-Being in Digital Learning Environments: A Scoping Review

Gokce Topluk,¹ Gulden Genc^{2*}

¹ İnönü University, Malatya, Türkiye,  0009-0007-0048-311X

² İnönü University, Malatya, Türkiye,  0000-0002-2472-4041

* Corresponding author: Gülten Genç (gulden.genc@inonu.edu.tr)

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Abstract

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This systematic scoping review investigates the multifaceted factors influencing learner well-being in digital learning environments. Drawing upon the analysis of 50 peer-reviewed empirical studies published between 2010 and 2024, the study identifies and synthesizes key determinants that contribute to or hinder student well-being in digitally mediated education. Thematic analysis revealed seven core themes: psychological well-being, academic performance and engagement, social climate and emotional belonging, digital and technical competence, environmental and institutional strategy, general health, and students' mindset, motivation, and self-regulation. The findings underscore the central role of institutional efficiency, educator support, technological access, and socio-emotional engagement in shaping learner experiences. This review highlights the need for holistic educational strategies and inclusive digital pedagogy to enhance well-being, foster academic success, and reduce disparities in online learning contexts. The study contributes to the growing body of literature by offering a comprehensive framework that informs future research, policy, and instructional practices in digital education.

Keywords

Learner well-being
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Introduction

The concept of learner well-being has gained considerable prominence in educational discourse, particularly with the growing recognition of humanistic approaches to teaching and learning. In contrast to traditional models that regarded learners as passive recipients of information, contemporary perspectives emphasize the holistic nature of students—acknowledging them as complex individuals whose emotional, social, and psychological states significantly influence their educational engagement and achievement (Dodge et al., 2012; Ramadan, 2021). The interplay between emotional stability and cognitive engagement has thus become a central concern for educators and researchers alike. Drawing upon Maslow's hierarchy of needs, educational psychology underscores that unmet psychological or physiological needs can obstruct learners' ability to pursue higher-level goals such as self-actualization (Gorman, 2010). This framework illustrates the foundational necessity of well-being in enabling learners to thrive both academically and personally. In this context, enhancing learner well-being is not merely a supplementary concern, but rather a fundamental prerequisite for effective learning. As Dix et al. (2020) note, well-being initiatives in educational settings have been linked to improvements in academic performance, extracurricular involvement, and overall student engagement.

Parallel to growing interest in well-being, recent years have witnessed an unprecedented transformation in educational delivery, particularly driven by the COVID-19 pandemic. The abrupt transition to online learning highlighted both the potential and limitations of digital environments. Emerging research has revealed that learners in virtual classrooms frequently report feelings of isolation, disconnection, and emotional strain due to reduced interpersonal interaction (Groarke et al., 2020; Balica, 2021). Studies indicate that symptoms of depression among students increased significantly during the pandemic period (Lanza et al., 2022), and factors such as social isolation, anxiety, and insufficient peer interaction negatively impacted psychological well-being (Liu et al., 2021; Frolova et al., 2021). These findings underscore the urgent need to reevaluate how digital learning environments shape learner well-being. Given the increasing prevalence of technology-mediated instruction, it is critical to investigate the dimensions, determinants, and consequences of learner well-being in digital settings. This study aims to conduct a systematic scoping review of the factors influencing learner well-being within digital learning environments, synthesizing current empirical evidence to inform both educational theory and practice.

Literature Review

Definitions and Conceptualizations of Well-being

Despite the widespread usage of the term, well-being remains a complex and multidimensional construct with no universally agreed-upon definition (Dodge et al., 2012). While commonly associated with concepts such as life satisfaction, happiness, and quality of life, the construct of well-being extends beyond these surface-level interpretations. Burns (2017) defines psychological well-being as encompassing inter and intrapersonal functioning, including self-perceptions of mastery, personal growth, and relationships. Similarly, Alexandrova (2017) situates well-being at the core of social science, identifying it as the fundamental aim of societal development. From a psychological perspective, well-being is frequently described as a combination of positive emotions, life satisfaction, and optimal functioning (Huppert, 2009; Bautista et al., 2023). These diverse yet

overlapping definitions highlight the subjective and experiential nature of the construct, necessitating an exploration of its constituent dimensions.

Dimensions of Well-being

To operationalize the construct of well-being, Seligman's (2011) PERMA model provides a widely recognized theoretical framework composed of five interrelated but independently measurable elements. The first component, positive emotion, encompasses experiences of joy, satisfaction, and optimism, serving as the emotional foundation of psychological well-being. Engagement refers to a deep psychological involvement in meaningful activities, often characterized by a state of flow that facilitates immersion and focus (Schaufeli, 2013). The third dimension, relationships, underscores the importance of supportive and positive social connections, which are central to an individual's sense of life satisfaction. Equally vital is the notion of meaning, which involves having a sense of purpose and belonging to something larger than oneself, contributing to an individual's existential fulfillment. Finally, accomplishment highlights the pursuit and achievement of goals, reflecting personal growth, intrinsic motivation, and perseverance. Collectively, these five dimensions offer a comprehensive and robust model for understanding and assessing well-being across a range of educational and social contexts.

Learner Well-Being: Individual and Environmental Factors

Learner well-being encompasses subjective evaluations of various life domains, including academic success, social interactions, and emotional health (Andrews & McKennell, 1980). Research indicates a strong association between learner well-being and educational outcomes, with factors such as personality traits, socioeconomic background, and physical health playing significant roles (Andrew & Withey, 1976; Argyle, 1999; Abbott et al., 2008). While demographic variables account for a portion of the variance in well-being, individual psychological characteristics such as extraversion and resilience are equally influential (Gutierrez et al., 2005). Institutional and pedagogical practices also significantly influence student well-being. Baik, Larcombe, and Brooker (2019) identify seven key domains affecting learner well-being: academic teaching practices, student support services, institutional culture, course design, program administration, assessment, and peer interactions. Notably, the perceived approachability and communication skills of academic staff emerged as the most critical determinant of student well-being. Supporting this, Blackman (2020) found that students lacking supportive teachers were significantly more likely to report dissatisfaction with life. Van Petegem et al. (2006) proposed a multilevel model illustrating how learner well-being is shaped by a constellation of school level, classroom level, and student level factors. These include institutional characteristics, classroom dynamics, and teacher-student interpersonal relationships—all of which jointly determine the emotional climate of the learning environment.

The Rise of Digital Learning Environments

The rapid evolution of digital technologies has transformed educational environments, expanding both the scope and accessibility of learning resources. From CDROMs in the 1980s to contemporary, educational systems have undergone profound changes (Hill & Hannafin, 2001). The COVID-19 pandemic further accelerated this

transformation, shifting the majority of educational activities to digital platforms. This progression reflects not only technological advancement but also pedagogical adaptation. Digital environments have introduced new opportunities and challenges. While they enable personalized learning and greater access to content, they may also reduce interpersonal engagement and exacerbate emotional strain. A systematic review by Byers et al. (2018) demonstrated that various types of learning environments—traditional, blended, open-plan, and innovative—differentially impact academic outcomes. Open plan designs, for example, may hinder concentration, while innovative environments tend to foster engagement and achievement. Cranton (2006) and Closs et al. (2022) emphasize that hands-on, collaborative, and socially interactive learning strategies are highly valued by students and contribute positively to their educational experiences. However, the shift to online formats during the pandemic has raised concerns about social isolation and diminished peer interaction, which may undermine students' well-being and academic success (Fraser, 1998; Chen et al., 2017).

Despite the increasing attention to learner well-being and the widespread adoption of digital learning environments, there is a lack of comprehensive synthesis of the factors influencing well-being in these contexts. While numerous empirical studies have investigated isolated aspects—such as teacher support, technological accessibility, or individual resilience—no systematic scoping review has yet mapped the full range of determinants within digital education settings. In response to the rapid technological advancements that continue to transform the educational landscape, this study seeks to underscore the critical importance of learner well-being in digital learning environments. Specifically, the aim is to identify and synthesize the key indicators and pedagogical strategies that contribute to the promotion of student well-being in these evolving contexts. By offering a systematic scoping review of the relevant literature, this study aims to inform future educational practices that support learners' holistic development in digitally mediated settings. Grounded in the objective of exploring the role of digital educational environments in shaping learner well-being, this study addresses the following research question:

1. What are the main characteristics of the studies conducted on student well-being in digital learning environments between 2010 and 2024?
2. What factors have been reported to influence student well-being in digital learning environments according to the existing literature?

Method

Research Design

This study adopted a systematic scoping review design guided by the PRISMA ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) framework developed by Tricco et al. (2018). The aim was to comprehensively map the existing scholarly literature on factors influencing learner well-being within digital learning environments. To ensure a rigorous and transparent process, a structured search strategy was implemented across ten academic databases using relevant keywords. The identification, screening, and selection of sources were documented via a PRISMA flow diagram (Moher et al., 2009; Tricco et al., 2018). Inclusion and exclusion criteria were systematically applied to determine eligible studies. Following study selection, relevant data were extracted and classified based on methodological characteristics (e.g., research

design, data collection tools), publication metadata (e.g., year of publication, country), and educational level. The extracted data were analyzed thematically, in line with Braun and Clarke's (2006) approach, to identify recurrent concepts and synthesize themes across the studies. This approach enabled an organized and theory-informed understanding of the topic, highlighting prevailing research directions and future opportunities.

Procedure

The review procedure included a comprehensive database search across ProQuest, ResearchGate, JSTOR, ERIC, Semantic Scholar, Springer, Web of Science, Frontiers, Scopus, and Elsevier. Keywords such as “student well-being in the digital classroom environment,” “learner well-being in the online classroom environment,” and related combinations were used. Initial filtering excluded non-English articles and those published outside the 2010–2024 timeframe. In the final screening phase, studies were selected based on the presence of primary data collection methods. A total of 50 articles were included in the final review (see Figure 1).

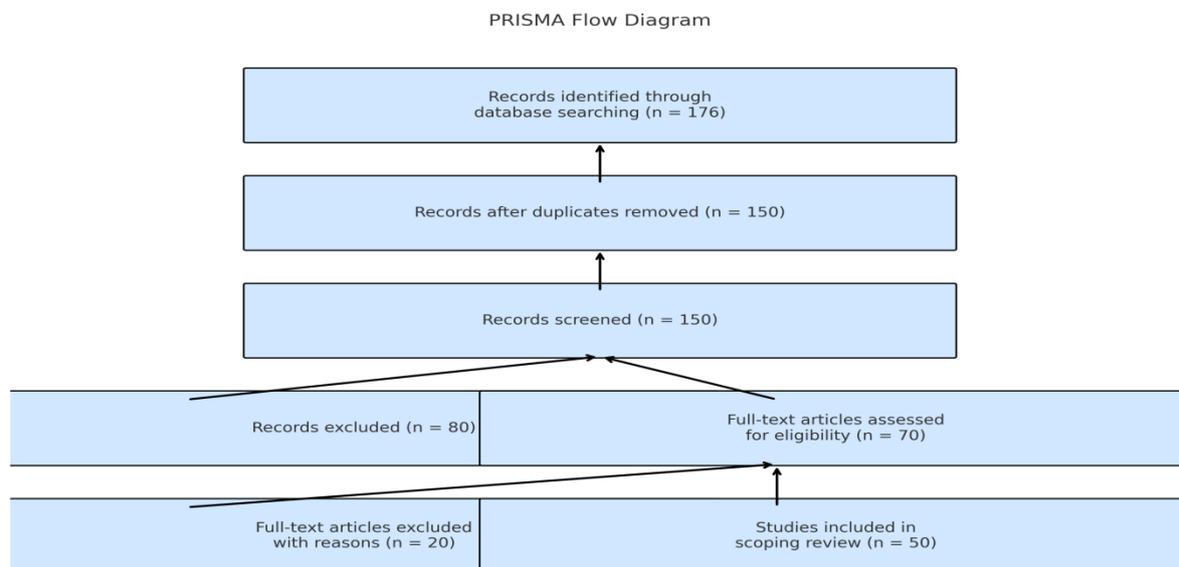


Figure 1. The Research Process

Inclusion Criteria

Consistent with established scoping review methodologies (Arksey & O'Malley, 2005; Peters et al., 2020), a set of inclusion criteria was developed to ensure that the studies selected for analysis demonstrated both academic rigor and thematic relevance. Accordingly, only studies whose titles or keywords explicitly included the terms “well-being” and “digital environments” were considered eligible. In addition, to maintain temporal relevance, the studies had to be published between the years 2010 and 2024. Eligible studies were also required to be indexed in one of the ten preselected academic databases, ensuring credibility and accessibility. Finally, to ensure the inclusion of original empirical evidence, only studies that employed primary data collection methods—such as surveys, interviews, observations, or experiments—were retained for review.

Exclusion Criteria

Studies were excluded from the review if they did not meet the predefined temporal, methodological, or source-related requirements. Specifically, any article published outside the targeted timeframe of 2010 to 2024 was omitted. Additionally, studies that were not retrieved from the designated academic databases were excluded to maintain consistency and source reliability. Lastly, articles that relied solely on secondary data analysis or literature-based reviews—rather than conducting original empirical research—were not included in the final selection.

Data Analysis

Thematic analysis was applied following the six-phase framework proposed by Braun and Clarke (2006), which involves familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining themes, and producing the report. A total of 50 articles were reviewed and coded. Shared meanings across the codes were grouped to identify broader thematic categories. This process allowed the identification of patterns, gaps, and emerging trends in the field of learner well-being within digital education. The relationships between the identified codes and corresponding themes were visualized in a thematic mapping, which provides a structured overview of the factors affecting learner well-being and the strategies used to support it.

Results

Overview of the Selected Studies

This section presents the findings of the scoping review, based on 50 eligible studies that met the predefined inclusion criteria. The analysis was structured around six key dimensions: database distribution, publication year, educational level, geographic location, methodological orientation, and data collection tools. These categories were examined to identify trends and patterns in the existing literature on learner well-being in digital learning environments.

Distribution across Academic Databases

The reviewed studies were retrieved from ten reputable academic databases: ProQuest, ResearchGate, JSTOR, ERIC, Semantic Scholar, Springer, Web of Science, Frontiers, Scopus, and Elsevier. The highest concentration of relevant studies was found in ProQuest (10), ResearchGate (9), and Semantic Scholar (8), highlighting these platforms as particularly rich sources of research on the topic (see Figure 2).

Springer (7) and ERIC (6) also demonstrated notable contributions. On the other hand, databases such as Elsevier, JSTOR, and Scopus yielded only one relevant study each, while Web of Science contained three. This uneven distribution may suggest both the differential focus of various databases on this area and possible limitations in their indexing or keyword coverage concerning learner well-being in digital contexts.

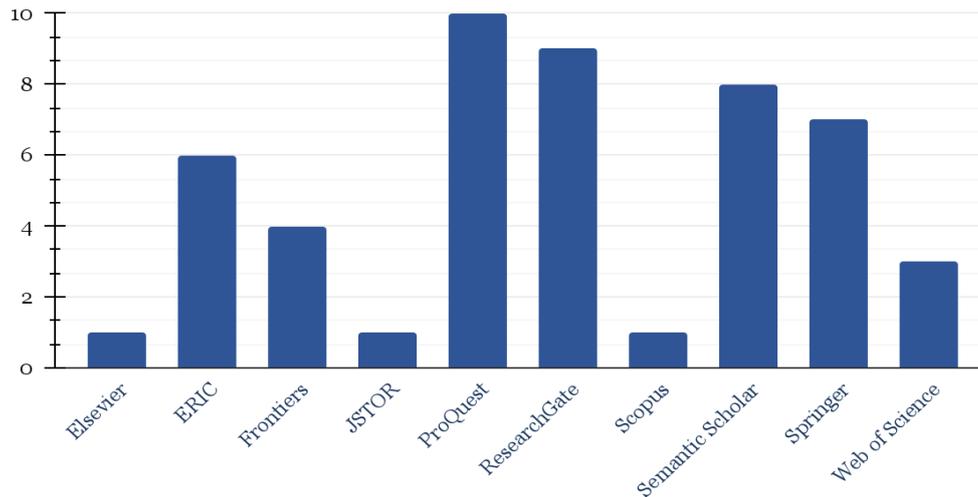


Figure 2. Distribution across Academic Databases

Temporal Distribution of Research

An analysis of the publication years (see Figure 3) reveals a marked increase in research interest over the last five years. The year 2023 had the highest number of publications (16), followed by 2024 (10), 2022 (9), and 2021 (7), indicating a clear upward trend. Earlier years, including 2012 and 2019, saw minimal activity, with only two publications each. Notably, no relevant studies were identified between 2013 and 2016, suggesting a potential research gap during this period. The recent surge reflects a growing recognition of the importance of learner well-being in digitally mediated educational settings, likely influenced by the global shift to online learning during and after the COVID-19 pandemic.

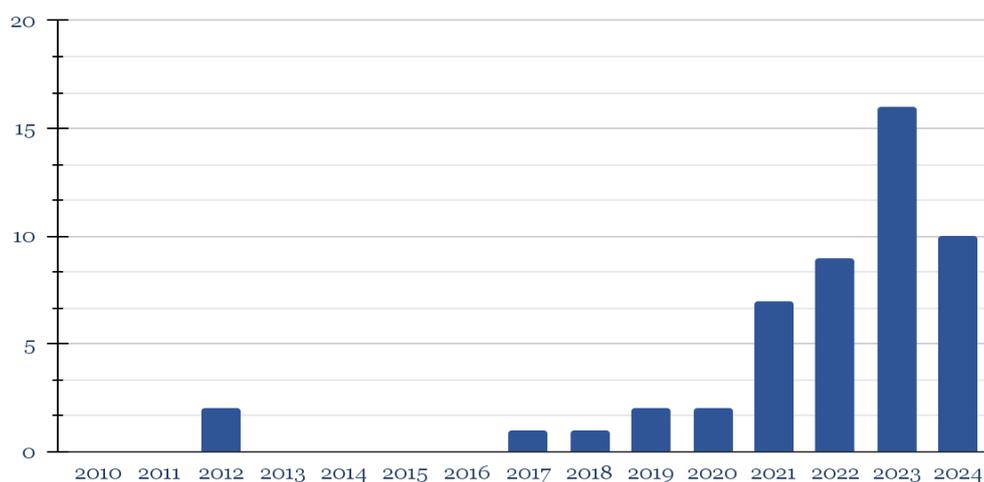


Figure 3. Temporal Distribution of Research

Educational Levels Represented

The vast majority of studies (42) focused on learners in higher education, indicating a predominant emphasis on university-level populations (see Figure 4). In contrast, secondary education was represented in only four studies,

and three studies explored mixed education levels. Graduate-level research appeared only once, while no studies were found to address elementary education. This disparity may stem from the challenges of assessing well-being among younger learners, who often lack the self-awareness or linguistic capacity to articulate their emotional states effectively in a research context.

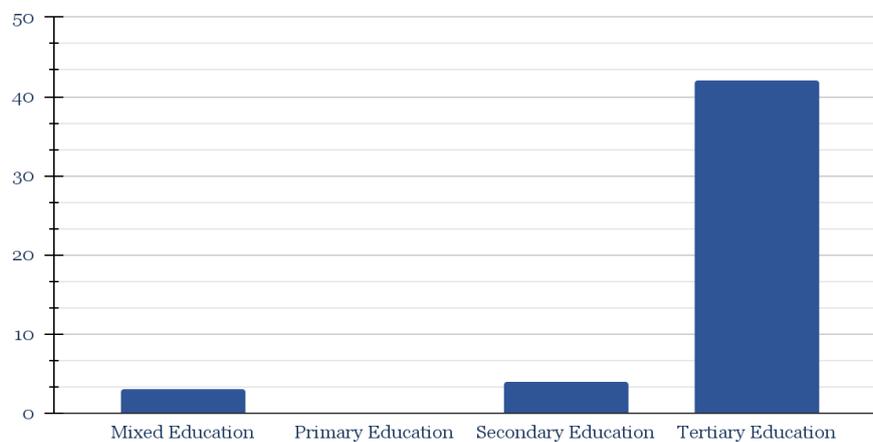


Figure 4. Educational Levels Represented

Geographical Distribution of Studies

The reviewed studies exhibited considerable geographical diversity, with contributions from multiple continents (see Figure 5). The leading countries in terms of research output were China (7), the United Kingdom (7), and the United States (6), followed by Romania (4). Other countries contributed one study each, including Australia, Austria, Brunei, Chile, Costa Rica, Finland, India, Indonesia, Italy, Malta, North Macedonia, Pakistan, the Philippines, Poland, Portugal, Russia, Serbia, South Africa, and Vietnam. This international distribution reflects a growing global concern for learner well-being in digital education, although regional disparities in research intensity remain evident.

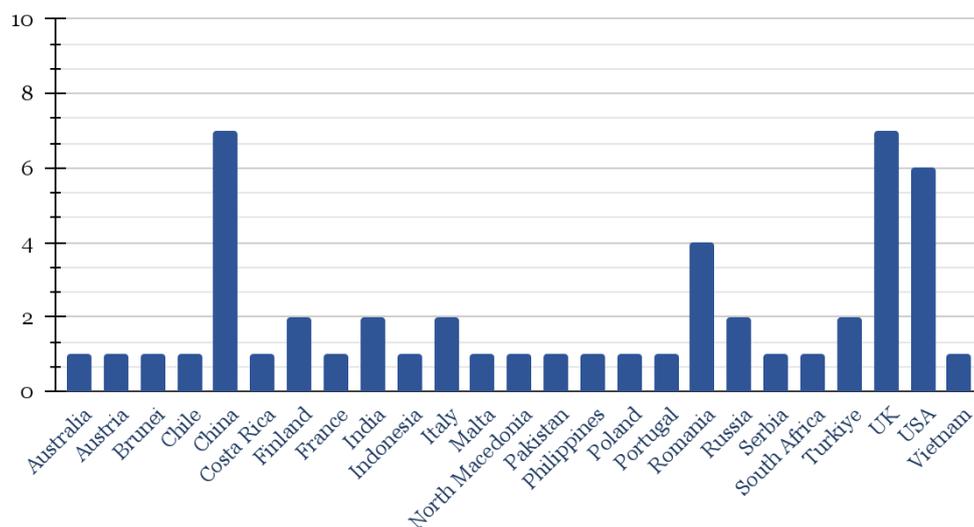


Figure 5. Geographical Distribution of Studies

Research Methodologies Employed

A strong preference for quantitative research methodologies was observed across the reviewed studies (see Figure 6). Of the 50 studies, 38 adopted a quantitative approach, suggesting a dominant reliance on numerical data and statistical analysis to examine learner well-being. In contrast, qualitative methodologies were employed in only seven studies, while five studies used mixed methods. This distribution underscores the field's methodological orientation toward measurable constructs, though it also points to a potential need for more in-depth qualitative inquiry to capture nuanced experiences and contextual factors.

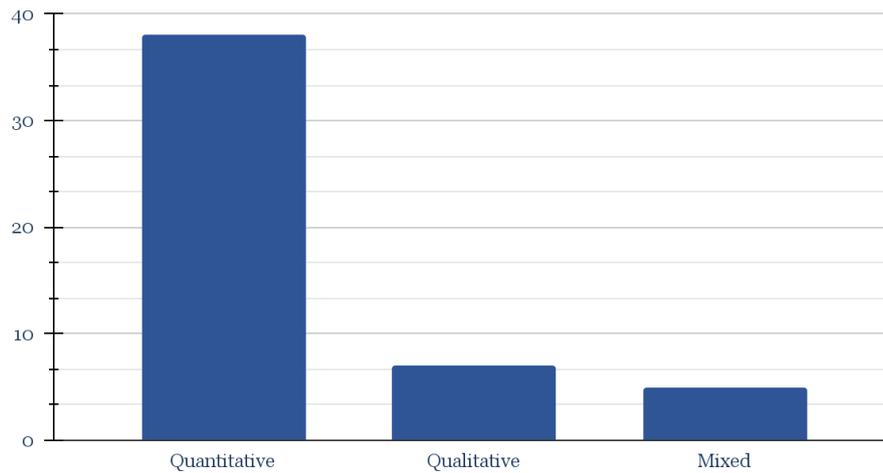


Figure 6. Research Methodologies Employed

Data Collection Instruments Used

The final category of analysis focused on the tools used to gather empirical data (see Figure 7).

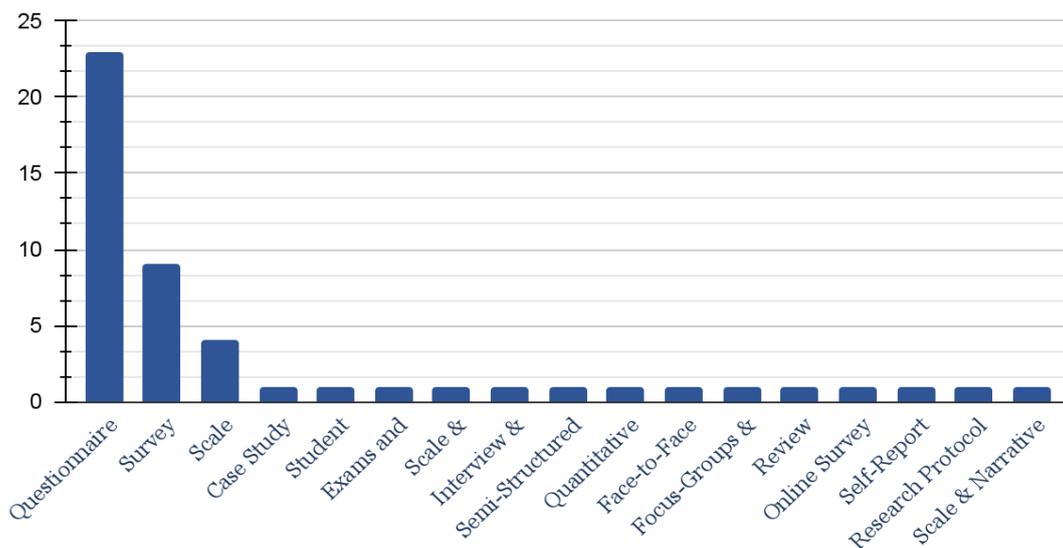


Figure 7. Data Collection Instruments Used

Questionnaires emerged as the most frequently used instrument (23 studies), followed by surveys (9) and scales (4), illustrating a strong preference for structured and standardized data collection formats. Less frequently employed tools included case studies, student reflections, interviews, focus groups, and online surveys, each appearing only once. This pattern suggests that while standardized instruments offer comparability and ease of analysis, more diverse or exploratory tools remain underutilized in this domain.

Emergent Themes from the Scoping Review

This section presents the results of a thematic analysis conducted on 50 peer-reviewed research articles addressing factors influencing learner well-being in digital learning environments. The analysis followed a structured coding process in which relevant data segments from each study were identified, labeled with initial codes, and subsequently grouped into broader conceptual categories. These categories were then consolidated into seven overarching themes, each representing a distinct aspect of learner well-being in digital educational contexts as can be seen in Table 1.

Table 1. Overview of Thematic Findings

Theme	Key Codes	Focus
Psychological State of Well-being	Anxiety, stress, emotional isolation, institutional trust, educator empathy	Emotional and psychological responses to digital learning environments
Academic Performance and Educational Engagement	Academic stress, motivation, proficiency level, engagement, task participation	Impact of digital engagement and academic performance on well-being
Social Climate and Emotional Belonging	Sense of community, peer support, student-teacher interaction, communication patterns	Influence of social interaction and connectedness in online education
Digital and Technical Competence	Internet access, digital literacy, device availability, technophobia	Technological readiness and digital confidence as factors of well-being
Environmental Factors and Institutional Strategy	Platform pedagogy, resource access, curriculum design, institutional planning	Structural and pedagogical design in institutional digital strategies
General Health	Sleep, sedentary behavior, mental fatigue, physical discomfort	Physical and mental health concerns linked to online education settings
Students' Mindset, Motivation, and Self-Regulation	Self-efficacy, intrinsic motivation, goal orientation, self-regulation strategies	Learners' agency, adaptability, and motivation in digital contexts

The thematic analysis revealed a range of factors that influence learner well-being in digital educational settings. Specifically, seven core themes were identified, encompassing the psychological state of well-being, academic performance and educational engagement, social climate and emotional belonging, digital and technical

competence, environmental factors and institutional strategy, general health, and students' mindset, motivation, and self-regulation. These themes were derived from multiple data points across the reviewed studies and represent both common and distinct dimensions of well-being as experienced by learners in online contexts. Each theme recurred with varying frequency, reflecting the complexity and multifaceted nature of well-being in digitally mediated educational environments.

Psychological State of Well-Being

The first and most frequently observed theme pertains to learners' psychological well-being in digital contexts. Codes such as anxiety, stress, emotional isolation, and institutional trust, and educator empathy clustered around this theme (Table 7). Several studies highlighted psychological distress (Apostol, et al., 2023; Quilon & Kurniawan, 2023; Tripon et al., 2023; Huey, 2024) resulting from the rapid shift to online education and students' difficulties in adapting to unfamiliar digital platforms (Buczak & Łukasik, 2021). In particular, technological anxiety and the perception of inadequate institutional support were linked to increased emotional strain. Codes such as confidence in institutional support (Acuña & Cisneros, 2024), perceived instructor empathy (Rodríguez-Ugalde & Díaz-Rojas, 2024), and emotional safety (Bliss et al., 2021) in the virtual classroom were consistently reported as protective elements. These elements were derived from studies that emphasized the role of educators' responsiveness (Li & Wang, 2024) and the perceived effectiveness of the institution (Quilon & Kurniawan (2023) in alleviating student stress and promoting emotional resilience.

Academic Performance and Educational Engagement

This theme includes codes such as academic stress (Blignaut et al., 2022), motivation (Agrawal & Krishna, 2021; Babakhova et al., 2023), proficiency level (Acuña & Cisneros, 2024), engagement (Li & Wang (2024) and task participation (Schettino et al., (2024). Several studies investigated the relationship between learners' well-being and their academic functioning in online environments (Morgan et al., 2023). Engagement was frequently associated with motivation (Tasneem & Bano (2023) and was often presented as both a cause and consequence of academic success (Rakow et al., 2023); Rodríguez-Ugalde & Díaz-Rojas (2024). Indicators such as interactive teaching, proficiency level (Vagos & Carvalhais, 2022), and academic ranking were commonly found to influence well-being through their impact on learners' self-perception and performance. Some studies also identified declining concentration and increased performance anxiety as notable risk factors during remote learning (Sun & Liu, 2023; Syed (2021; Wang, 2023).

Social Climate and Emotional Belonging

This theme encompasses relational and affective dimensions such as sense of community, peer support, student-teacher interaction, and social support. The data indicate that learner perceptions of belonging, inclusion, and relational safety strongly influenced their sense of well-being in digital classrooms (Panesi et al., 2020; Douglas et al., 2024). Codes reflecting supportive peer networks, (Kiikeri et al., 2024; Lin & Wang, 2024; Morgan et al., 2023) accessibility of instructors (Hoi, 2022), and mutual respect in communication (Schettino et al., 2024;

Seydooğulları, 2023) consistently appeared across multiple studies. The development of a collaborative learning atmosphere seems to be a mitigating factor for stress, particularly in times of educational disruption.

Digital and Technical Competence

Codes categorized under this theme include internet access (Hosszu et al., 2022; Jiang et al., 2024), digital literacy (Gauci et al., 2022; Qureshi et al., 2023), device availability (Saastamoinen et al., 2023), and technophobia (Tasneem & Bano, 2023). Studies commonly reported that students' ability to manage technological demands directly affected their confidence, engagement, and emotional well-being in digital learning environments. Digital competence was frequently mentioned in connection with broader institutional infrastructure and student preparedness. Several sources also highlighted technophobia (Li & Wang, 2024), technical breakdowns, and low digital literacy (Kurniawan (2023) as recurring challenges to student well-being.

Environmental Factors and Institutional Strategy

This theme reflects the broader structural and pedagogical conditions that shape the learner experience in digital settings. Key codes such as platform pedagogy (Driscoll et al., 2012; Xiao et al., 2023), resource access (Acuña & Cisneros, 2024; Dinu et al., 2022), curriculum design (Panesi et al., 2020; Tasneem & Bano, 2023), and institutional planning (Liu et al., 2023; Saastamoinen et al., 2023) emerged prominently. Studies cited platform pedagogy (Gauci et al., 2022) and institutional planning (Seydooğulları, 2023) in digital infrastructure as central to promoting or inhibiting well-being. Additionally, factors such as curriculum flexibility, resource accessibility, and educational leadership responsiveness were also identified as strategic levers that either supported or undermined students' mental health and engagement.

General Health

This theme incorporates physical and mental health dimensions, including codes like sleep (Morgan et al., 2023; Burcin et al., 2019), sedentary behavior (Sazdovska-Pigulovska (2021; Morgan et al., 2023), physical discomfort (Buczak & Łukasik, 2021; Tripon et al., 2023), and mental fatigue (Dinu et al., (2022; Hosszu et al., 2022). The shift to screen-intensive learning environments introduced challenges to physical well-being, which in turn affected students' psychological and academic functioning (Üzmez & Kavakli Ulutaş (2024). Several studies connected physical health indicators with broader emotional states, emphasizing the interdependence of physical and psychological components of well-being (Vagos & Carvalhais (2022). Environmental disruptions and lack of ergonomic conditions were also mentioned (Rakow et al., 2023).

Students' Mindset, Motivation, and Self-Regulation

The final theme focuses on learner agency, internal resilience, and attitudes toward the learning process. Codes such as self-efficacy (Susanto et al., 2024 ; Timokhin et al., 2021), intrinsic motivation (Kiikeri et al., (2024; Brachtl et al., (2023), goal orientation (Morgan et al., 2023), and self-regulation strategies (Buczak & Łukasik,

2021; Üzmez & Kavaklı Ulutaş, 2024) were consistently identified. Learners with higher levels of autonomy and internal motivation were found to demonstrate greater emotional stability and engagement in online learning (Liu et al. (2023). The presence of self-regulation skills and a positive mindset was associated with greater resilience in adapting to digital learning conditions. Conversely, loss of motivation and self-doubt were linked to reduced well-being and academic disengagement (Pratiwi et al., 2022; Rodríguez-Ugalde & Díaz-Rojas, 2024).

Discussion

Discussion and Interpretation of the General Characteristics of the Articles

The uneven distribution of studies across academic databases—where Pro-Quest, Research-Gate, and Semantic Scholar yielded the highest number of relevant publications—suggests that research on learner well-being in digital environments is primarily disseminated through platforms that specialize in educational and social sciences. This is consistent with Hill and Hannafin (2001), who argue that as educational technologies evolve, research dissemination becomes increasingly dependent on accessible and discipline-specific repositories. The significant rise in publications after 2020 coincides with the COVID-19 pandemic, which accelerated the transition to online learning and prompted urgent scholarly interest in its effects on student well-being. This finding aligns closely with Groarke et al. (2020) and Lanza et al. (2022), who report that reduced in-person interaction during the pandemic heightened students' sense of isolation and emotional distress. Similarly, Liu et al. (2021) and Frolova et al. (2021) underscore that many students experienced psychological strain and difficulty adapting to online learning environments. The present review confirms these findings by revealing that a substantial portion of recent research focuses on emotional and social challenges in digital education, suggesting that the pandemic served as a catalyst rather than an origin for interest in learner well-being. The lack of studies between 2013–2016 reflects how the field failed to anticipate the socio-emotional implications of increasing digitalization before it became urgent, supporting the claim made by Dix et al. (2020) that schools had not adequately prioritized well-being before the crisis.

An overwhelming focus on higher education learners (42 of 50 studies) was observed, with minimal attention given to primary, secondary, or graduate-level students. This mirrors observations by Baik, Larcombe & Brooker (2019), who emphasized that well-being support in universities is more structured and measurable compared to earlier educational stages. However, this focus may be problematic; as Frolova et al. (2021) and Durlak et al. (2011) suggest, early educational experiences are critical for establishing emotional resilience and socio-emotional skills. The neglect of younger learners is particularly concerning in light of research showing that emotional regulation and self-perception are developmental constructs (Gorman, 2010; Maslow via Dix et al., 2020), and thus must be nurtured from an early age. Consequently, this imbalance reveals a significant gap in the literature and a pressing need for age-sensitive well-being studies that include children and adolescents in digital learning contexts.

While the inclusion of studies from diverse countries demonstrates global engagement with the topic, the dominance of high-income nations—especially China, the UK, and the USA—points to a skewed research geography. This finding supports Alexandrova (2017) and Jarden & Roache (2023), who argue that

conceptualizations of well-being are often rooted in Western sociopolitical contexts, which may not reflect global diversity. The presence of only one or two studies from countries across Africa, South America, and parts of Asia further emphasizes the need for context-sensitive research, especially considering the digital divide and cultural differences in emotional expression and educational expectations. These findings highlight that while learner well-being is a globally recognized concern, its theoretical and empirical grounding remains unevenly distributed.

The strong dominance of quantitative methodologies (38 of 50 studies) and the widespread use of structured instruments such as questionnaires and surveys mirrors trends in educational psychology, where well-being is often operationalized through predefined scales (e.g., Huppert, 2009; Seligman, 2011). While these tools offer reliability and comparability, they may lack the depth required to explore subjective and relational dimensions of well-being, which are emphasized in the PERMA model (Seligman, 2011) and in Schaufeli's (2013) conception of engagement. The relative absence of qualitative and mixed-method studies stands in contrast to recommendations by Balica (2021) and Cranton (2006), who advocate for interpretive, learner-centered approaches that can account for the social and emotional complexities of digital learning. This suggests a methodological gap in the literature—one that limits our understanding of learner well-being to what is easily quantifiable.

The predominance of questionnaires and surveys as primary data collection tools reinforces the trend toward standardization and efficiency. However, as Andrews & McKennell (1980) and Burns (2017) highlight, well-being is fundamentally a subjective and situational phenomenon that may not be fully captured through closed-ended instruments. The infrequent use of reflective methods—such as student journals, interviews, or focus groups—indicates a missed opportunity to gather rich, context-sensitive narratives. Moreover, as digital tools like AI and collaborative platforms evolve (Hill & Hannafin, 2001; Closs et al., 2022), future research should consider integrating more interactive and participatory tools to better align with the evolving nature of digital learning itself. In the systematic scoping review part findings from 50 empirical studies identified seven interrelated themes that align with the multidimensional and dynamic nature of well-being, as conceptualized by Seligman's (2011) PERMA model and supported by empirical frameworks such as those by Hone et al. (2016) and Durlak et al. (2011). Each of the emergent themes is closely tied to the learners' educational experiences in digital settings and reflects both personal and institutional determinants. The discussion below interprets the significance of these themes in light of the existing literature and highlights the areas that corroborate and contrast with previous research.

Interpretation of Themes in Relation to the Literature

Psychological Well-Being

Psychological well-being emerged as the most recurrent and critical theme across the reviewed studies. This theme encompasses emotional stability, a sense of purpose, and life satisfaction—all of which have been historically validated as fundamental to learning and self-actualization (Maslow, as cited in Gorman, 2010; Dodge et al., 2012). The results of Agrawal and Krishna (2021) and Rakow et al. (2023) mirror the broader findings of Groarke et al. (2020), who noted that the abrupt shift to online education during the pandemic disrupted students' emotional

security, increased feelings of isolation, and exacerbated anxiety. In line with Dinu et al. (2022), the current review also confirmed that institutions that provide adequate digital infrastructure and prioritize emotional engagement can effectively buffer students against stress. Importantly, this review underscores the mediating role of educator presence and sensitivity in shaping student psychological states. As also emphasized by Bliss et al. (2020) and Kiikeri et al. (2024), supportive instructor behaviors and clear communication positively affect learners' perceptions of control and self-worth. These findings extend Sazdovska Pigulovska's (2021) arguments that digital well-being cannot be disentangled from human connection, even in highly mediated environments.

Academic Performance and Educational Engagement

The link between academic engagement and psychological well-being is widely acknowledged in prior studies (Sun & Liu, 2023; Lin & Wang, 2024). The current review supports these associations and also highlights that digital learners' academic stress, if not mitigated by institutional scaffolding, can reduce well-being (Syed, 2021). However, the results also indicate variability: while Jiang et al. (2024) reported increased motivation in online language learning, Stančić and Senić Ružić (2022) documented a diminished sense of community in virtual settings—suggesting that the effectiveness of digital engagement may hinge on context and pedagogical design. Moreover, Walters et al. (2022) showed that students with learning difficulties are particularly at risk in online education, pointing to the urgent need for inclusive design. These findings reinforce the conclusions of Bliss et al. (2020) and Liu et al. (2023), who advocated for equity, personalization, and meaningful academic tasks to improve digital learning outcomes.

Social Climate and Emotional Belonging

Consistent with the literature (Fraser, 1998; Durlak et al., 2011; Apostol et al., 2023), the sense of belonging and connectedness with peers and educators is a central determinant of student well-being. Multiple studies included in the review—such as Bliss et al. (2020), Rakow et al. (2023), and Vagos & Carvalhais (2022)—converge on the point that social support mitigates feelings of disconnection and strengthens resilience in digital education. This aligns with the work of Panesi et al. (2020), who found that both peer and teacher interaction contribute to perceptions of inclusion and well-being. Conversely, studies such as Rodríguez Ugalde & Díaz Rojas (2024) revealed a decline in perceived emotional support over time, highlighting that sustained effort is necessary to maintain a positive climate in virtual learning. These patterns validate Van Petegem et al.'s (2006) framework, which positions interpersonal dynamics as core to educational well-being.

Digital and Technical Competence

The review confirms prior findings (Deng & Yang, 2021; Dinu et al., 2022) that digital competence significantly shapes learner well-being in online education. Students with higher levels of digital literacy reported greater autonomy, self-regulation, and engagement. Saastamoinen et al. (2023) and Susanto et al. (2024) emphasized the need for institutions to invest in both technological infrastructure and digital confidence. However, as shown by Schettino et al. (2022), lacking assessment of student readiness for technology-mediated learning can lead to

exclusion and stress. These findings are in line with Hoi (2022), who stressed that equity in digital access must be paralleled with psychosocial support. Therefore, digital competence should be conceptualized not only as technical proficiency but also as a psychological asset.

Environmental and Institutional Strategies

Environmental and institutional structures play a pivotal role in determining the quality of digital learning. Studies reviewed here (e.g., Barrable et al., 2018; Tripon et al., 2023) echo earlier findings by Driscoll et al. (2012) and Papadatou Pastou et al. (2019), demonstrating that carefully designed platforms and pedagogies can enhance students' academic and emotional experiences. These findings affirm Hill and Hannafin's (2001) arguments regarding the transformation of educational resources and their implications for institutional strategy. Contrastingly, Buczak & Łukasik (2021) highlighted the limitations of online settings when not matched by adequate support, suggesting that institutional strategy must be flexible and student-centered. This necessitates not just digital adaptation but also deliberate planning of teaching, communication, and feedback mechanisms—as also emphasized by Biggins & Holley (2023) and Quilon & Kurniawan (2023).

General Health

In line with Vagos & Carvalhais (2022) and Burcin et al. (2019), this review reveals that well-being in digital education cannot be separated from general health factors, including mental, emotional, and even physical health. Though Qureshi et al. (2022) argue that online education did not negatively impact well-being in all contexts; many students still report heightened symptoms of anxiety, stress, and physical inactivity. These health concerns—especially as outlined by Buczak & Łukasik (2021)—should inform how institutions structure student services and engagement strategies in digital contexts.

Student Mindset, Motivation, and Self-Regulation

Finally, the review supports the claim that well-being in digital settings is closely related to students' intrinsic motivation and self-regulatory strategies. As per Panesi et al. (2020) and Liu et al. (2023), creating opportunities for autonomy, mastery, and purpose can bolster student engagement and mental well-being. Similarly, Vayre & Vonthron (2017) emphasized the mediating role of academic self-efficacy and teacher support. Studies such as Susanto et al. (2024) and Rakow et al. (2023) further highlight that structured digital materials, positive teacher-learner dynamics, and motivational scaffolds significantly enhance learners' perseverance and emotional resilience. However, as Gauci et al. (2022) caution, learners with poor concentration or low motivation may experience deteriorating well-being if appropriate instructional designs are not implemented.

Conclusion

This scoping review synthesized findings from 50 empirical studies to map the key factors that influence learner well-being in digital learning environments. Drawing on a thematic analysis, seven core dimensions were

identified: psychological well-being, academic performance and engagement, social climate and emotional belonging, digital and technical competence, environmental and institutional factors, general health, and students' mindset, motivation, and self-regulation. The review provides a comprehensive understanding of how these interconnected elements shape students' educational experiences in digitally mediated contexts, especially in the wake of widespread shifts to online education during and after the COVID-19 pandemic.

The psychological state of well-being emerged as a central theme, with students' mental health, emotional resilience, and perceptions of institutional effectiveness playing a significant role in shaping their overall satisfaction and academic success. Studies indicated that institutions that proactively supported digital transitions and maintained strong communication practices helped mitigate anxiety and isolation among learners. Moreover, the role of educators in fostering positive learning climates and responding to students' emotional needs was consistently emphasized across multiple sources.

Academic performance and engagement were closely linked to learner well-being. Students who reported higher motivation, active participation, and meaningful learning experiences—facilitated by supportive instructors and well-structured digital platforms—tended to express more positive perceptions of their educational journey. Conversely, limited interaction, unclear expectations, and high academic stress were noted as factors diminishing learners' engagement and satisfaction. The importance of social climate and emotional belonging was another prominent dimension, underscoring the role of interpersonal connections, peer support, and a sense of community in enhancing well-being. The research emphasized the psychological benefits of positive peer relationships and teacher-student rapport, particularly in mitigating feelings of loneliness and disconnection in remote learning environments. In terms of digital and technical competence, access to reliable technology, confidence in navigating digital tools, and institutional investment in technical infrastructure were found to significantly impact students' learning satisfaction and emotional stability. Students with low digital literacy or limited access to technology often experienced heightened stress and disengagement, reinforcing the need for targeted institutional support and inclusive digital education policies. Environmental and institutional strategies were also shown to play a critical role in learner well-being. Well-resourced and thoughtfully designed digital environments, clear course structures, and flexible pedagogical approaches were positively associated with students' academic and emotional outcomes.

Institutional responsiveness to students' evolving needs—through timely feedback, curriculum adjustments, and inclusive practices—was highlighted as essential to fostering resilience and well-being. General health, encompassing both physical and mental aspects, was identified as an integral yet often under-addressed factor in online education. Studies pointed to increased sedentary behavior, screen fatigue, and deteriorating mental health among students, suggesting that institutions must embed health-promoting practices into their digital education strategies. Finally, students' mindset, motivation, and self-regulation were shown to be foundational to successful learning experiences in digital environments. Learners with strong intrinsic motivation, adaptive coping strategies, and effective time management skills reported more positive academic and emotional outcomes. These findings reinforce the importance of integrating self-regulatory skill development into digital curricula and providing learners with opportunities to reflect, plan, and monitor their progress.

Recommendations

In sum, this review underscores that learner well-being in digital education is a multifaceted construct influenced by individual, pedagogical, social, and institutional factors. As digital learning becomes increasingly prevalent, educators, policymakers, and institutions must take a proactive and holistic approach to support student well-being. Future efforts should prioritize inclusive pedagogical practices, equitable access to technology, psychological support systems, and the cultivation of learner agency, thereby ensuring that digital education environments contribute not only to academic success but also to the holistic development of learners.

The findings of this review emphasize the need for a holistic, integrated approach to fostering learner well-being in digital learning environments. Institutions should prioritize supportive pedagogy, technological accessibility, inclusive practices, and socio-emotional scaffolding. Teachers should be trained to recognize signs of distress and to respond with empathy and flexibility, while course designs must move beyond content delivery to promote meaningful interaction, engagement, and student agency. Although this review synthesizes a broad range of empirical studies, it is limited by its reliance on English language sources and a post-2010 publication window. Future research could explore longitudinal trajectories of well-being, cross-cultural variations, and the role of emerging technologies such as AI tutors or metaverse platforms in shaping student well-being. Moreover, the intersectionality of learner characteristics—such as disability, gender identity, or economic background—warrants further investigation within digital contexts.

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Appendix. Themes, Key Codes, Articles, and Focus

Theme	Key Codes (frequencies in each article)	Articles Involving the Codes with the Specific Focus	Focus
Psychological State of Well- being	Anxiety (9;13;5;9;6;1; 2; 11; 4; 14; 3; 9; 16; 7; 5; 7; 33; 20; 20; 7; 4; 2; 16; 4; 9; 3; 2; 1; 3; 5; 1; 10; 3; 1; 1; 16; 8)	Apostol, et. al., (2023); Agrawal & Krishna, (2021); Babakhova et al., (2023); Barrable et al. (2018); Biggins & Holley (2023); Blignaut et al. (2022); Bliss et al. (2021); Burcin et al., (2019); Deng & Yang (2021); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Huey (2024); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Morgan et al., (2023); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Seydoğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Syed (2021); Tasneem & Bano (2023); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Üzmez & Kavakli Ulutaş (2024).	Emotional and psychological responses to digital learning environments
	Stress (3; 70;45;6; 22; 62; 52; 2; 19; 1; 10; 2; 23; 3; 15; 1; 2; 18; 36; 2; 5; 35; 8; 21; 3; 1; 23; 59; 8; 2; 11; 6; 79; 5; 3; 11; 1; 2; 1; 19; 1; 3)	Apostol, et. al., (2023); Babakhova et al., (2023); Barrable et al. (2018); Biggins & Holley (2023); Blignaut et al. (2022); Brachtl et al., (2023); Buczak & Łukasik (2021); Burcin et al., (2019); Driscoll et al., (2012); Deng & Yang (2021); Dinu et al., (2022); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Huey (2024); Kiikeri et al., (2024); Li & Wang (2024); Morgan et al., (2023); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Seydoğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Syed (2021); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Xiao et al., (2023); Üzmez & Kavakli Ulutaş (2024).	
	Emotional Isolation (2; 2; 1; 1; 1; 3; 3; 2; 2; 2; 2; 1; 2; 2; 2; 2; 1; 3; 1; 1; 3; 2)	Blignaut et al. (2022); Buczak & Łukasik (2021); Burcin et al., (2019); Driscoll et al., (2012); Dinu et al., (2022); Gauci et al., (2022); Hosszu et al., (2022); Jiang et al., (2024); Li & Wang (2024); Lin & Wang (2024); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Sazdovska-Pigulovska (2021); Seydoğulları (2023); Sun & Liu (2023); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Wang (2023);	
	Institutional Trust (27; 6; 2; 1; 1; 7; 1; 2; 1; 5; 2; 4; 3; 4; 2; 2)	Acuña & Cisneros (2024); Blignaut et al. (2022); Brachtl et al., (2023); Buczak & Łukasik (2021); Burcin et al., (2019); Deng & Yang (2021); Hosszu et al., (2022); Panesi et al., (2020); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Sazdovska-Pigulovska (2021); Stančić & Senić Ružić (2022); Sun & Liu (2023); Tripon et al., (2023); Üzmez & Kavakli Ulutaş (2024).	
	Educator Empathy (11; 1; 1; 3; 3; 20; 1; 15; 2; 15; 34; 3; 4; 1; 5; 2; 28; 2; 2; 4; 12; 1; 1; 4; 1; 1;	Acuña & Cisneros (2024); Blignaut et al. (2022); Bliss et al. (2021); Deng & Yang (2021); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Hosszu et al., (2022); Huey (2024); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Panesi et al., (2020); Quilon & Kurniawan (2023);	

Theme	Key Codes (frequencies in each article)	Articles Involving the Codes with the Specific Focus	Focus
	13)	Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Vayre & Vonthron (2017); Üzmez & Kavakli Ulutaş (2024).	
Academic Performance and Educational Engagement	Academic Stress (1; 1; 15; 5; 1; 16; 1; 5; 24; 2; 1; 1; 3; 77; 1)	Blignaut et al. (2022); Gauci et al., (2022); Hosszu et al., (2022); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Sazdovska-Pigulovska (2021); Sun & Liu (2023); Syed (2021); Wang (2023);	Impact of digital engagement and academic performance on well-being
	Motivation (8;2;2;4;2;1;50;5;1; 2;8;1;5; 116; 10; 115; 1; 15; 107; 1; 5; 2; 16; 25; 6; 25; 2; 17; 18; 30; 2; 5; 8; 1; 3; 4; 5; 4; 17)	Apostol, et, al.,, (2023); Agrawal & Krishna, (2021); Babakhova et al., (2023); Barrable et al. (2018); Biggins & Holley (2023); Bliss et al. (2021); Brachtel et al., (2023); Deng & Yang (2021); Dinu et al., (2022); Driscoll et al., (2012); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Xiao et al., (2023); Üzmez & Kavakli Ulutaş (2024).	
	Proficiency Level (2; 1; 1; 6; 4; 1; 8; 1; 8; 9; 1; 26; 2; 1; 1; 2, 1; 3; 20; 3; 1; 3; 1; 1; 2)	Acuña & Cisneros (2024); Brachtel et al., (2023); Buczak & Łukasik (2021); Dinu et al., (2022); Driscoll et al., (2012); Hoi (2022); Jiang et al., (2024); Kiikeri et al., (2024); Lin & Wang (2024); Liu et al., (2023); Morgan et al., (2023); Panesi et al., (2020); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Syed (2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Xiao et al., (2023);	
	Engagement (1;2;8;4;6;1; 15; 6;4;1; 53; 7; 128; 17; 15; 7; 55; 11; 8; 24; 8; 9; 1; 6; 2; 12; 2; 7; 120; 3; 24; 1; 83; 23; 4; 7)	Apostol, et, al., (2023); Agrawal & Krishna, (2021); Biggins & Holley (2023); Blignaut et al. (2022); Bliss et al. (2021); Brachtel et al., (2023); Deng & Yang (2021); Douglas et al., (2024); Driscoll et al., (2012); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Xiao et al., (2023); Üzmez & Kavakli Ulutaş (2024).	
	Task Participation (1;3; 2; 2; 7; 2; 5; 6; 1; 1; 2; 1; 7; 2; 1;	Acuña & Cisneros (2024); Buczak & Łukasik (2021); Deng & Yang (2021); Douglas et al., (2024); Hoi (2022); Huey (2024); Jiang et al., (2024); Li & Wang (2024); Lin & Wang (2024); Liu et al., (2023);	

Theme	Key Codes (frequencies in each article)	Articles Involving the Codes with the Specific Focus	Focus
	7; 1; 1; 3; 4; 3; 1; 2; 1; 2)	Morgan et al., (2023); Pratiwi et al., (2022); Quilon & Kurniawan (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Timokhin et al.,(2021); Tripon et al., (2023); Vayre & Vonthron (2017); Walters et al., (2022);	
Social Climate and Emotional Belonging	Sense Of Community (3; 8; 3; 2; 1; 2; 5; 3; 6; 1; 20; 17; 2; 3; 1; 2; 1; 1; 4; 1; 1; 1; 7; 23)	Acuña & Cisneros (2024); Blignaut et al. (2022); Bliss et al. (2021); Douglas et al., (2024); Dinu et al., (2022); Gauci et al., (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Morgan et al., (2023); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Seydooğulları (2023); Stančić & Senić Ružić (2022); Susanto et al., (2024); Syed (2021); Tripon et al., (2023); Vayre & Vonthron (2017);	Influence of social interaction and connectedness in online education
	Peer Support (3; 1; 6; 11; 4; 1; 5; 12; 7; 4; 1; 14; 5; 9; 3; 6; 2; 13; 7; 16; 1; 2; 5; 2; 8; 7; 13; 3)	Apostol, et. al., (2023); Bliss et al. (2021); Buczak & Łukasik (2021); Deng & Yang (2021); Driscoll et al., (2012); Dinu et al., (2022); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Lin & Wang (2024); Morgan et al., (2023); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Tasneem & Bano (2023); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022);	
	Student-Teacher Interaction (2; 5; 2; 5; 1; 26; 4; 20; 1; 5; 2; 4; 5; 6; 5; 1; 2; 20; 1; 2; 2; 10; 3; 2; 2; 4; 58; 11; 2; 76)	Acuña & Cisneros (2024); Blignaut et al. (2022); Bliss et al. (2021); Buczak & Łukasik (2021); Deng & Yang (2021); Driscoll et al., (2012); Gauci et al., (2022); Hoi (2022); Hosszu et al., (2022); Huey (2024); Jiang et al., (2024); Kiikeri et al., (2024); Lin & Wang (2024); Pratiwi et al., (2022); Pratiwi et al., (2022); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Xiao et al., (2023);	
	Communication Patterns (1; 1; 2; 1; 3; 1; 1; 2; 1; 3; 1; 4; 1; 2; 6; 1; 1; 1; 3; 26; 1; 18; 3; 3; 1; 6; 8; 3)	Buczak & Łukasik (2021); Burcin et al., (2019); Deng & Yang (2021); Driscoll et al., (2012); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Liu et al., (2023); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Seydooğulları (2023); Stančić & Senić Ružić (2022); Susanto et al., (2024); Tasneem & Bano (2023); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Xiao et al., (2023); Üzmez & Kavaklı Ulutaş (2024).	
Digital and Technical Competence	Internet Access (1; 1; 1; 2; 1; 2; 1; 1; 1; 9; 1; 2; 1; 18; 4; 1;	Biggins & Holley (2023); Blignaut et al. (2022); Bliss et al. (2021); Buczak & Łukasik (2021); Douglas et al., (2024); Dinu et al., (2022); Driscoll et al., (2012); Gauci et al., (2022); Hoi (2022); Hosszu et al.,	Technological readiness and digital

Theme	Key Codes (frequencies in each article)	Articles Involving the Codes with the Specific Focus	Focus
	1; 13; 1; 10; 1; 1; 2)	(2022); Jiang et al., (2024); Lin & Wang (2024); Panesi et al., (2020); Quilon & Kurniawan (2023); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Syed (2021); Tasneem & Bano (2023); Timokhin et al.,(2021); Tripon et al., (2023); Xiao et al., (2023);	confidence as factors of well-being
	Digital Literacy (3; 2; 7; 1; 1; 1; 2; 1; 2; 1; 1)	Acuña & Cisneros (2024); Deng & Yang (2021); Dinu et al., (2022); Driscoll et al., (2012); Gauci et al., (2022); Hosszu et al., (2022); Kiikeri et al., (2024); Lin & Wang (2024); Liu et al., (2023); Quilon & Kurniawan (2023); Qureshi et al., (2023); Saastamoinen et al., (2023);	
	Device Availability (21; 1; 1; 1; 1; 5; 2; 1; 2; 4; 1; 5; 1; 1; 1; 3)	Brachtl et al., (2023); Burcin et al., (2019); Deng & Yang (2021); Dinu et al., (2022); Gauci et al., (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Panesi et al., (2020); Quilon & Kurniawan (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sun & Liu (2023); Tripon et al., (2023);	
	Technophobia (2; 1; 43; 1)	Li & Wang (2024); Quilon & Kurniawan (2023); Schettino et al., (2024); Tasneem & Bano (2023);	
Environmental Factors and Institutional Strategy	Platform Pedagogy (3; 13; 1; 17; 3; 1; 1; 2; 7; 3; 1; 4; 1; 2; 1; 7; 4)	Acuña & Cisneros (2024); Driscoll et al., (2012); Gauci et al., (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Panesi et al., (2020); Quilon & Kurniawan (2023); Rakow et al., (2023); Sazdovska-Pigulovska (2021); Sun & Liu (2023); Susanto et al., (2024); Tripon et al., (2023); Vayre & Vonthron (2017); Xiao et al., (2023); Üzmez & Kavakli Ulutaş (2024).	Structural and pedagogical design in institutional digital strategies
	Resource Access (14; 3; 3; 3; 3; 2; 15; 7; 3; 6; 6; 1; 3; 2; 4; 4; 8; 2; 4; 3; 1; 1; 6; 12; 1; 1)	Acuña & Cisneros (2024); Blignaut et al. (2022); Brachtl et al., (2023); Burcin et al., (2019); Deng & Yang (2021); Douglas et al., (2024); Dinu et al., (2022); Driscoll et al., (2012); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Liu et al., (2023); Panesi et al., (2020); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Sazdovska-Pigulovska (2021); Schettino et al., (2024); Seydooğulları (2023); Sun & Liu (2023); Tripon et al., (2023); Vayre & Vonthron (2017); Üzmez & Kavakli Ulutaş (2024).	
	Curriculum Design (1; 1; 1; 2; 1; 1; 1; 2; 1; 4; 2; 2; 1; 1; 2; 1; 5; 3; 3)	Bliss et al. (2021); Dinu et al., (2022); Douglas et al., (2024); Driscoll et al., (2012); Gauci et al., (2022); Jiang et al., (2024); Li & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Panesi et al., (2020); Quilon & Kurniawan (2023); Qureshi et al., (2023); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Sun & Liu (2023); Syed (2021); Tasneem & Bano (2023); Tripon et al., (2023); Wang (2023);	
	Institutional Planning (7; 2; 2; 1; 8; 1; 5; 2; 1; 9; 1; 7; 1; 1; 2)	Acuña & Cisneros (2024); Bliss et al. (2021); Deng & Yang (2021); Hosszu et al., (2022); Jiang et al., (2024); Liu et al., (2023); Panesi et al., (2020); Quilon & Kurniawan (2023); Rakow et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Seydooğulları (2023); Stančić & Senić Ružić (2022); Sun & Liu (2023); Vayre & Vonthron (2017);	
General Health	Sleep (1; 2; 8; 2; 11; 2; 1; 1; 1; 1; 1; 1; 1; 1)	Barrable et al. (2018); Buczak & Łukasik (2021); Burcin et al., (2019); Hosszu et al., (2022); Morgan et al., (2023); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rakow et al., (2023); Schettino et al., (2024); Syed	Physical and mental health concerns linked

Theme	Key Codes (frequencies in each article)	Articles Involving the Codes with the Specific Focus	Focus
		(2021); Tasneem & Bano (2023); Tripon et al., (2023); Vagos & Carvalhais (2022); Wang (2023);	to online education settings
	Sedentary Behavior (4; 1; 1)	Burcin et al., (2019); Morgan et al., (2023); Sazdovska-Pigulovska (2021);	
	Mental Fatigue (2; 2; 6; 6; 1; 2; 2; 2)	Buczak & Łukasik (2021); Deng & Yang (2021); Dinu et al., (2022); Hosszu et al., (2022); Huey (2024); Kiikeri et al., (2024); Quilon & Kurniawan (2023); Wang (2023);	
	Physical Discomfort (1; 3; 6; 2; 1; 1; 1; 1; 4; 1; 2; 1; 3; 1; 1)	Bliss et al. (2021); Brachtl et al., (2023); Buczak & Łukasik (2021); Burcin et al., (2019); Hosszu et al., (2022); Panesi et al., (2020); Qureshi et al., (2023); Rakow et al., (2023); Sazdovska-Pigulovska (2021); Seydooğulları (2023); Syed (2021); Timokhin et al.,(2021); Tripon et al., (2023); Wang (2023); Üzmez & Kavaklı Ulutaş (2024).	
Students' Mindset, Motivation, and Self-Regulation	Self-Efficacy (3;2;1;1; 2; 3; 2; 13; 1; 9; 10; 2; 4; 1; 40; 2; 21; 1; 5)	Barrable et al. (2018); Bignaut et al. (2022); Deng & Yang (2021); Hoi (2022); Hosszu et al., (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Sazdovska-Pigulovska (2021); Stančić & Senić Ružić (2022); Susanto et al., (2024); Tripon et al., (2023); Vayre & Vonthron (2017); Wang (2023); Xiao et al., (2023);	Learners' agency, adaptability, and motivation in digital contexts
	Intrinsic Motivation (50; 1; 1; 2; 1; 1; 5; 116; 10; 5; 1; 15; 9; 1; 2; 1; 1; 2; 1; 1; 2; 1)	Brachtl et al., (2023); Deng & Yang (2021); Dinu et al., (2022); Douglas et al., (2024); Driscoll et al., (2012); Hoi (2022); Hosszu et al., (2022); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Panesi et al., (2020); Papadatou-Pastou et al., (2019); Quilon & Kurniawan (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Tripon et al., (2023); Xiao et al., (2023);	
	Goal Orientation (4; 4; 1; 4; 3; 10; 2; 1; 16; 3; 2; 16; 5; 1; 1; 1; 1; 1; 2; 3; 3; 10; 6; 3; 3; 1)	Acuña & Cisneros (2024); Bliss et al. (2021); Buczak & Łukasik (2021); Deng & Yang (2021); Douglas et al., (2024); Driscoll et al., (2012); Hoi (2022); Jiang et al., (2024); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Morgan et al., (2023); Pratiwi et al., (2022); Panesi et al., (2020); Quilon & Kurniawan (2023); Rakow et al., (2023); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Timokhin et al.,(2021); Tripon et al., (2023); Vayre & Vonthron (2017); Xiao et al., (2023); Üzmez & Kavaklı Ulutaş (2024).	
	Self-Regulation Strategies (12; 2; 4; 1; 1; 1; 1; 2; 1; 1; 2; 2; 3; 1; 1; 14; 1; 1; 1; 1; 2; 1; 11)	Buczak & Łukasik (2021); Driscoll et al., (2012); Hoi (2022); Kiikeri et al., (2024); Li & Wang (2024); Lin & Wang (2024); Panesi et al., (2020); Quilon & Kurniawan (2023); Qureshi et al., (2023); Rodríguez-Ugalde & Díaz-Rojas (2024); Saastamoinen et al., (2023); Sazdovska-Pigulovska (2021); Stančić & Senić Ružić (2022); Sun & Liu (2023); Susanto et al., (2024); Timokhin et al.,(2021); Tripon et al., (2023); Vagos & Carvalhais (2022); Vayre & Vonthron (2017); Walters et al., (2022); Wang (2023); Xiao et al., (2023); Üzmez & Kavaklı Ulutaş (2024).	