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Executive Summary

Work Package 2 (WP2) of the GLITTER project—strenGthening learners' digital weLlbeIng using effective Teaching pracTices and digital EnviRonments—plays a foundational role in advancing the project's mission to promote digital wellbeing in school education. Focused on mapping best practices and designing a whole-school approach, WP2 aims to build a robust evidence base that informs scalable, inclusive, and context-sensitive interventions for both primary and secondary education.

Coordinated by Aurel Vlaicu University of Arad (UAV), Romania, in collaboration with CARDET, Cyprus, WP2 spans the first ten months of implementation (Months 1–10) and acts as the conceptual and empirical backbone of the entire GLITTER initiative. Its outcomes will directly support the development of systemic transformation strategies to improve learners' digital experiences across Europe.

The work package is structured around four key tasks, beginning with Activity T2.1, which lays the theoretical groundwork through a comprehensive literature review. This initial task explores the conceptual underpinnings of digital wellbeing in education, with the goal of clarifying how the term is defined, operationalized, and measured in current academic and institutional discourse. The review draws from multidisciplinary sources in psychology, education, digital pedagogy, and policy, aiming to consolidate diverse interpretations into a cohesive and applicable understanding.

Specifically, Task T2.1 explores the multifaceted impact of digital technologies on the cognitive, emotional, social, and behavioral wellbeing of children and adolescents within educational settings. This task adopts a balanced perspective, critically examining both the risks—such as excessive screen exposure, online safety vulnerabilities, digital fatigue, and fragmented attention—and the opportunities, including enhanced digital agency, development of media literacy, promotion of responsible digital citizenship, and improved equity in access to educational resources. By evaluating these dual dimensions, T2.1 offers a comprehensive and context-sensitive understanding of the digital wellbeing landscape in contemporary schools.

The outcomes of T2.1 will culminate in Deliverable D2.1: "Understanding the Concept of Digital Wellbeing in the Teaching and Learning Process." This deliverable, a 20-page synthesis report, will offer a comprehensive portrait of the concept of digital wellbeing, its relevance for educational stakeholders, and its implications for pedagogical practice and school climate. It will articulate key dimensions of digital wellbeing—such as digital self-regulation, balance, inclusion, and emotional resilience—while identifying the critical factors and contexts that influence learners' wellbeing in digital environments.

More than just a background review, T2.1 provides the conceptual framing and strategic orientation for all subsequent WP2 activities. It informs the development of a best practices compendium (T2.2), national and transnational policy mappings (T2.3), and ultimately, the formulation of a whole-school framework for digital wellbeing (T2.4). As such, WP2 serves as both the intellectual engine and methodological compass of the GLITTER project's

commitment to creating inclusive, ethical, and supportive digital ecosystems in European education.

Abbreviations and acronyms

Abbreviation	Definition
AI	Artificial Intelligence
DLMM	Digital Learning Maturity Model
EdTech	Educational Technology
MOOC	Massive Open Online Course

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D2.1 UNDERSTANDING THE CONCEPT OF DIGITAL WELLBEING IN THE TEACHING AND LEARNING PROCESS

T2.1 LITERATURE REVIEW ON RESEARCH ON DIGITAL WELLBEING IN RELATION TO THE EDUCATION SECTOR

1. Introduction: understanding digital wellbeing in education

This literature review serves a dual function within the scope of Work Package 2. Firstly, it offers a conceptual and empirical synthesis of the current state of research on digital wellbeing, laying the groundwork for a shared understanding among partners. Secondly, and more importantly, it provides the evidence base needed to inform the subsequent tasks of the project—particularly T2.2 (Best Practices Compendium), T2.3 (National Mapping), and T2.4 (Whole School Approach Framework). By distilling key psychological, pedagogical, and institutional insights from the literature, this review guides partners in identifying effective interventions, culturally responsive strategies, and policy-enabling conditions. These insights will be instrumental in selecting and evaluating real-world practices across project countries, aligning them with the conceptual pillars of digital wellbeing, and translating them into practical guidelines that will shape the structure, culture, and curricula of participating schools. Thus, this review is not a standalone academic exercise but a strategic foundation for ensuring that the project's outputs are evidence-informed, context-sensitive, and scalable across diverse educational systems.

In the digital age, where technology has become embedded in virtually every domain of personal, educational, and professional life, digital wellbeing has emerged as a critical and multidimensional construct at the intersection of education, psychology, digital ethics, and human-computer interaction. The growing pervasiveness of smartphones, tablets, learning management systems, social media platforms, and artificial intelligence in educational contexts has generated profound shifts in how learners engage with information, construct knowledge, and manage their social and emotional lives. In this complex landscape, the need to foster healthy, sustainable, and meaningful interactions with digital technologies has catalyzed the conceptual development of digital wellbeing.

Digital wellbeing is not simply about the duration of digital media use—a reductionist view often centered around "screen time"—but rather about the quality, intentionality, and

psychological consequences of digital interactions. Vanden Abeele (2021) defines digital wellbeing as a *dynamic, context-dependent state in which digital technologies are used in ways that promote rather than hinder wellbeing*. Similarly, Gui, Fasoli, and Carradore (2017) conceptualize digital wellbeing as the extent to which the digital environment supports or detracts from the cognitive, emotional, social, and moral flourishing of individuals, particularly youth.

This construct encompasses a range of interrelated components, including:

- *Cognitive wellbeing* (clarity, focus, critical thinking),
- *Emotional wellbeing* (managing digital stress, online empathy),
- *Social wellbeing* (digital connectedness and belonging),
- *Physical wellbeing* (ergonomics, sleep, movement), and
- *Ethical wellbeing* (respect for privacy, digital citizenship, and autonomy).

Recent scholarship has emphasized the need for conceptual clarity and operational coherence in defining and applying digital wellbeing, especially in educational research and policy (Burr, Taddeo, & Floridi, 2020; Bahar, Roslan, Ping, & Yusoff, 2024). As Burr et al. (2020) argue, digital wellbeing should be understood not only through the lens of individual self-care or mental health, but also as an *ethical and socio-technical issue*, deeply embedded in the design and governance of digital systems. This means considering how the structures and functionalities of digital tools shape user behavior, autonomy, attention, and emotional states.

Their approach proposes a multidisciplinary model that integrates ethical design, user autonomy, and systemic digital governance into the conceptualization of digital wellbeing. Complementing this view, Al-Mansoori, Al-Thani, and Ali (2023) offer a scoping review that identifies various frameworks for translating wellbeing principles into design heuristics and pedagogical practices. Roffarello and De Russis (2023) add to this by demonstrating how digital wellbeing can be enhanced through user-centered feedback systems, nudging users towards balanced and intentional technology use.

In educational contexts—ranging from early childhood to higher education—the integration of digital wellbeing is not merely an add-on or wellness initiative but a core component of holistic development and effective pedagogy. Within schools and universities, educators are recognized as *key agents* in modeling, teaching, and scaffolding digital wellbeing (Chambers, Jones, Murphy, & Sandford, 2018). Design thinking, as proposed by

Chambers et al., is particularly useful here, offering a structured yet flexible approach to creating learning environments that are attuned to students' emotional needs, cognitive load, and digital agency.

Educators are increasingly encouraged to align digital pedagogies with the principles of positive psychology, which focus on fostering resilience, engagement, motivation, and personal growth. As Rad, Rad, Demeter, and Maier (2022) and Themelis and Sime (2020) argue, digital wellbeing must be built into curricula through intentional design choices, including pacing of digital tasks, integration of reflective practices, collaborative tools that build community, and feedback systems that promote autonomy rather than surveillance.

This approach shifts the focus from mere harm prevention—such as avoiding cyberbullying or limiting device use—to proactive cultivation of digital literacy, balance, and agency. Studies by Monge Roffarello and De Russis (2019, 2021) further highlight the importance of embedding self-regulation features in educational platforms to help students become conscious, strategic, and ethical users of digital technologies.

A growing body of empirical research has demonstrated that attention to digital wellbeing correlates with improvements in student engagement, academic outcomes, emotional resilience, and identity formation. Prabowo, Sitthiworachart, and Sriwisathiyakun (2025) showed that integrating digital storytelling and peer assessment into coursework significantly enhanced students' self-awareness, reflective thinking, and emotional regulation. Similarly, Lister et al. (2022) found that co-designed tools that prioritize student voice and participation led to stronger learner identities and reduced mental health concerns in digitally mediated environments.

However, as Foster et al. (2024) emphasize, the operationalization of digital wellbeing policies must be context-specific. Their review of guidance from the UK and Vietnam reveals that while core values may be shared globally—such as empowerment, safety, and inclusion—the implementation pathways must be adapted to local educational cultures, infrastructures, and digital ecologies.

The equitable implementation of digital wellbeing frameworks is paramount. Vulnerable learners—including those with disabilities, from migrant backgrounds, or experiencing socio-economic hardship—often face amplified digital risks and unequal access to supportive resources (Nansen et al., 2012; Hakami, El Aadmi, & Hernández-Leo, 2021). To

address this, scholars advocate for inclusive design principles, such as accessibility standards, multilingual support, and culturally relevant content. Policy frameworks such as those analyzed by Nageswaran et al. (2022) and Royo, Sime, Themelis, and Sicilia (2019) stress the importance of institutional strategies that bridge digital divides and foster psychological safety and emotional inclusion.

The digital wellbeing of educators is equally critical and often overlooked. As digital demands increase—through remote teaching, assessment technologies, and constant connectivity—educators are reporting higher levels of burnout, digital fatigue, and work-life boundary erosion (Passey, 2021). Research by Yu et al. (2022) reveals that teachers' perceptions of organizational support, digital competence, and role clarity significantly influence their own wellbeing in digital work environments.

In this regard, Rad et al. (2021) propose a whole-school approach to digital wellbeing, which integrates wellbeing not only at the level of individual behavior but into organizational structures, leadership models, curriculum goals, and school culture. This systemic strategy ensures that digital wellbeing is sustained not through isolated initiatives, but through long-term, structural transformation.

Technological tools are increasingly being developed to monitor, support, and enhance digital wellbeing in education. Learning analytics, for example, can be used to detect signs of disengagement, overload, or emotional distress in students (Hakami et al., 2021). Self-control applications, browser extensions, and dashboard feedback tools allow users to gain real-time insights into their digital behaviors and make informed decisions (Roffarello & De Russis, 2023). Furthermore, media literacy programs play a foundational role in equipping learners with the critical thinking skills necessary to understand how digital content affects their emotions, beliefs, and identities (Gui et al., 2017).

Nonetheless, as Smits, Kim, Van Goor, and Ludden (2022) note, the field of digital wellbeing still suffers from conceptual fragmentation and practical inconsistency. They argue that future developments must move toward integrative, interdisciplinary models that bridge educational science, psychology, design, and public health.

Digital wellbeing is a multifaceted and evolving concept that calls for deep integration into educational research, practice, and policy. It is not only a matter of avoiding harm, but of constructing digital experiences that nurture human potential. Given the increasing complexity

and diversity of digital wellbeing research, a bibliometric analysis is now warranted to systematically map the intellectual structure, thematic trends, and conceptual developments in the field.

2. Literature review: conceptual foundations and empirical advances in digital wellbeing research

This literature review provides a necessary conceptual foundation for the bibliometric analysis that follows. By summarizing key theoretical models, empirical findings, and design frameworks, it clarifies the core constructs and variables that shape the current understanding of digital wellbeing in education. This foundation enables a more meaningful interpretation of the bibliometric data, as it defines the psychological, pedagogical, social, and institutional dimensions that are later clustered through co-occurrence mapping. While the bibliometric analysis offers a structural overview of the field, the literature review provides the substantive content and critical context for understanding the significance of those clusters. Taken together, the two sections are designed to be complementary: the review offers depth and interpretation, while the bibliometric approach supplies breadth and synthesis. This dual strategy ensures coherence with the project's goals in Work Package 2, particularly the evidence-informed development of a whole-school digital wellbeing framework.

The evolving notion of digital wellbeing lies at the confluence of technological innovation, educational transformation, and human psychological development. As digital environments increasingly permeate the daily lives of children, adolescents, and educators alike, digital wellbeing has become a psychologically rich and context-sensitive construct, one that captures the intersection of cognitive functioning, emotional balance, social connectedness, and behavioral regulation within digital contexts (Büchi, 2024; Roffarello, De Russis, Lottridge, & Cecchinato, 2023).

Rather than a static or narrowly defined condition, digital wellbeing is best conceptualized as a dynamic state of psychological balance that enables individuals to engage meaningfully, safely, and autonomously with technology. This includes the ability to manage digital risks, such as cyberbullying and tech overuse, while also leveraging digital tools for self-expression, learning, connection, and identity formation. As such, digital wellbeing represents a core dimension of holistic human development, particularly for learners growing up in digital-native societies (Tran et al., 2020; Evans & Robertson, 2020; Chambers et al., 2018).

Within educational systems, particularly in the post-pandemic era, the incorporation of digital wellbeing into pedagogical frameworks and digital infrastructures has gained

unprecedented importance. Institutions are now actively designing and evaluating curricula, platforms, and digital learning tools through the lens of psychological wellbeing (Moldavan, Edwards-Leis, & Murray, 2022; Potter et al., 2022). This shift is not only a response to rising levels of digital stress and disengagement but a proactive strategy to empower learners and educators in their digital ecosystems.

Foundational work by Peters, Calvo, and Ryan (2018) applied self-determination theory (SDT)—a cornerstone of psychological motivation research—to digital learning design. SDT emphasizes the basic psychological needs for autonomy, competence, and relatedness, proposing that environments which support these needs will enhance intrinsic motivation and psychological wellbeing. Translated into digital contexts, this theory suggests that students thrive when digital tools afford meaningful choices, facilitate mastery, and support positive social interactions.

Building on this foundation, Burr and Floridi (2020) have highlighted the ethical dimensions of digital wellbeing, arguing for a multidisciplinary approach that acknowledges the moral responsibilities of designers, educators, and policymakers. Their work reframes digital wellbeing as a socio-technical construct—one shaped not only by user choices but by the design architectures and governance structures within which users operate. Tools such as AI-driven chatbots (Zaky, 2023), mobile cognitive scaffolding systems (Alhalafawy et al., 2021), and educational self-control platforms (Ceccarini et al., 2024) exemplify this shift from reactive risk mitigation to positive design philosophy rooted in values such as agency, respect, and empowerment.

From a psychological standpoint, digital wellbeing in young people is inextricably linked to executive function, self-regulation, and emotional intelligence. These core competencies are crucial for navigating digital environments, which often present constant stimuli, social comparison, and decision overload. Interventions that promote reflective awareness and co-creation, as proposed by Gennari et al. (2023), can enhance digital agency and mitigate feelings of helplessness or disengagement in students. Similarly, Cowling et al. (2024) emphasize that digital literacy programs must integrate emotional components, helping learners manage anxiety, avoid information fatigue, and cultivate positive online behaviors.

Educational institutions are beginning to recognize these developmental needs, and countries like Malaysia and China are integrating digital wellbeing into national policy and university-level practices. Abdullah, Mohd Zaidi, and Asar (2022) point to the role of institutional culture and leadership in making digital wellbeing a visible and actionable priority. Hu, Norman, and Nordin (2024), analyzing a decade of MOOC development in China, found increasing emphasis on embedded digital wellbeing features, such as user feedback loops, rest reminders, and mindfulness-based notifications.

The scientific study of digital wellbeing has also evolved through the development of psychometrically validated instruments. Arslankara et al. (2022) offer one of the first digital wellbeing scales adapted for teacher education, capturing multidimensional aspects such as digital overload, balance, and satisfaction. Rosič et al. (2024) extend this work to adolescents, developing the Perceived Digital Wellbeing in Adolescence Scale, which allows for nuanced understanding of wellbeing perceptions across diverse developmental stages. These tools respond to calls for evidence-based evaluation, ensuring that interventions are guided by rigorous data and tailored to specific population needs.

The psychological risks of poor digital wellbeing—especially under conditions of high digital dependency and insufficient support structures—have become more evident during and after the COVID-19 pandemic. Rich et al. (2020) and Blake et al. (2021) document increased rates of burnout, emotional exhaustion, and digital fatigue among medical and educational professionals, reinforcing the need for systematic self-care strategies embedded in organizational practices. Dennis (2021) advances a theoretical model of "online flourishing," proposing that digital wellbeing is not just the absence of harm, but the presence of meaningful engagement, digital mindfulness, and personal growth.

MacCallum (2022) and Rad & Demeter (2019) argue for systemic approaches that go beyond individual behavior change, advocating for institutional transformation toward digital environments that prioritize psychological resilience, equity, and sustainability.

Frameworks such as the Digital Learning Maturity Model (DLMM) proposed by Biggins, Holley, and Supa (2022) evaluate schools' and universities' readiness to implement digital wellbeing, examining infrastructure, digital culture, and staff capabilities. However, as highlighted by scoping reviews in early childhood (Cao & Li, 2023) and youth development

(Colder Carras et al., 2024), the field still suffers from conceptual ambiguity and a lack of developmentally sensitive interventions.

As digital wellbeing matures as a construct, scholars are increasingly attentive to contextual and cognitive variables that shape individual experience. For instance, Alhalafawy et al. (2021) show that cognitive style complexity influences how learners engage with digital scaffolds, while Ceccarini et al. (2024) and Hayama & Desai (2025) advocate for participatory and cross-sectoral collaboration to develop tools that are both usable and meaningful.

Digital wellbeing extends beyond school boundaries into homes and communities. Within families, parental mediation plays a significant role in shaping children's digital behaviors and attitudes. In their Norwegian study, Lafton, Wilhelmsen, and Holmarsdottir (2024) underscore the negotiation between digital opportunity and digital boundaries, while Holmarsdottir et al. (2025) emphasize the importance of understanding children's subjective experiences, particularly across cultural and socio-economic contexts.

The broader societal implications of digital wellbeing also include identity development, emotional regulation, and self-presentation online. Lister et al. (2024) and Cuomo et al. (2021) show how positive digital practices in higher education can foster learner identity and inclusion, while Nguyen (2021) and Nguyen, Büchi, and Geber (2024) highlight the psychological benefits of intentional disconnection in an "always-on" culture.

Despite these advances, digital wellbeing research remains fragmented. As Kisilowska (2021) notes, the concept is often entangled with adjacent but distinct constructs like Fear of Missing Out (FoMO) and information literacy. Mayiwar et al. (2024) propose a unified model of digital wellbeing determinants, integrating cognitive-emotional capacities, technological environments, and socio-cultural dynamics.

Given the diversity of populations, theoretical models, and intervention strategies, a bibliometric analysis is now both timely and necessary. Such an analysis can illuminate keyword co-occurrences and thematic clusters, offering a systematic overview of how digital wellbeing is operationalized in global education research.

3. Methodology

To investigate the conceptual structure and emerging trends in the field of digital wellbeing within school contexts, a bibliometric approach was adopted. Bibliometric analysis offers a systematic and quantitative method for examining large bodies of academic literature, enabling researchers to detect patterns of co-occurring terms, map knowledge domains, and trace the intellectual development of a field over time (Aria & Cuccurullo, 2017). This method is particularly well-suited for interdisciplinary areas such as digital wellbeing, where research spans education, psychology, technology, and public policy.

The literature corpus was retrieved from DimensionsAI, a comprehensive academic database that aggregates peer-reviewed publications across disciplines. To ensure a focused inquiry, the search query "digital wellbeing" AND school was applied across all available fields, including titles, abstracts, keywords, and full text when accessible. This strategy was designed to capture a wide and inclusive sample of publications that engage with the theme of digital wellbeing in formal educational environments. The search, conducted on April 18, 2025, yielded a total of 2279 unique records. These included journal articles, conference proceedings, and book chapters. To maintain consistency in textual analysis, only English-language documents were selected for further processing.

Once downloaded in CSV format, the dataset included essential bibliographic metadata such as title, author(s), abstract, publication year, journal or source, and indexed keywords. A preliminary data cleaning phase was conducted to enhance the validity of the analysis. This involved removing duplicate entries, as well as filtering out records that lacked abstracts or critical metadata necessary for semantic and co-occurrence analysis. Additional screening ensured that all retained documents were clearly related to educational applications of digital wellbeing, specifically addressing themes relevant to students, teachers, school systems, pedagogical tools, and wellbeing interventions. This refined dataset served as the foundation for subsequent bibliometric mapping and thematic clustering.

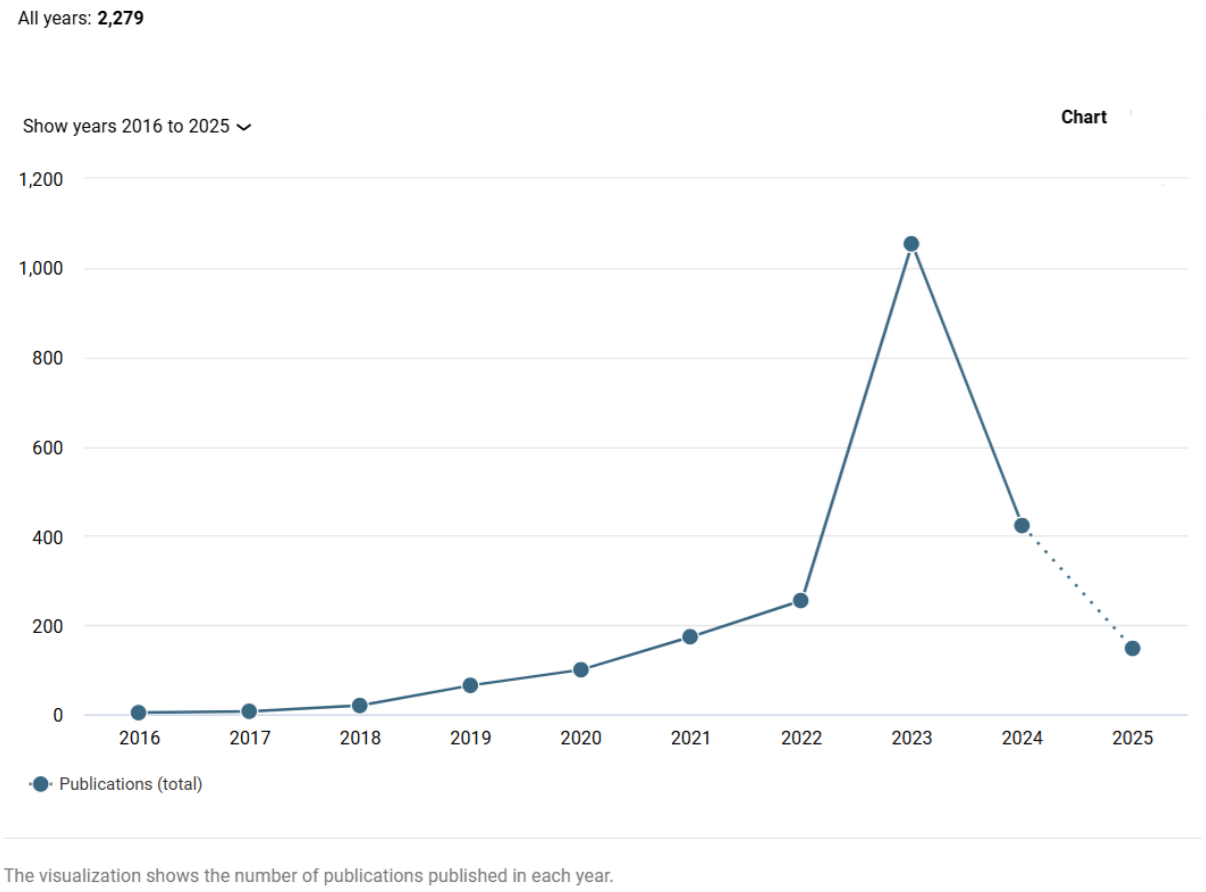

Figure 1 Annual Scientific Output on "Digital Wellbeing" and School (2016–2025) in DimensionsAI

The publication trend derived from DimensionsAI, based on the query "digital wellbeing" AND school, reveals a dynamic evolution in scholarly attention between 2016 and 2025, encompassing a total of 2,279 publications (Figure 1). This temporal analysis provides important insight into the developmental phases of digital wellbeing as an educational research domain.

Between 2016 and 2019, the number of publications remained low but gradually increased. This initial phase can be interpreted as the emergence period, during which digital wellbeing was still a nascent topic, often approached indirectly through broader discourses on digital literacy, e-safety, and educational technology. During this time, researchers began to explore foundational questions about how digital technologies impact students' emotional and cognitive functioning, though the topic had yet to attract widespread academic focus.

Starting in 2020, a clear acceleration in publication output is observed. This uptick coincides with the global onset of the COVID-19 pandemic, which rapidly transformed

educational systems by shifting instruction into online and hybrid formats. The sudden and sustained increase in digital interaction among students and teachers drew attention to issues such as screen fatigue, digital overload, and the need for emotional regulation in online learning contexts. As a result, research interest in digital wellbeing expanded significantly, reflecting an urgent need to understand and support learner and teacher wellbeing in increasingly digital environments.

This growth culminates in 2023, which marks the peak year in the dataset, with over 1,000 publications on the topic—by far the highest annual output within the observed time frame. The peak likely represents a culmination of several converging factors: research projects initiated during the pandemic began to yield published results, increased institutional and governmental funding supported wellbeing research, and scholarly communities converged around digital wellbeing as a central issue in the post-pandemic educational landscape. This period also saw heightened policy interest in integrating digital wellbeing into national education agendas, further reinforcing its prominence as a research priority.

Following this peak, there is a sharp decline in publication volume in 2024, with a continued projected decrease in 2025. Several factors may account for this trend. First, the intense wave of research output in 2023 may have temporarily saturated the field, prompting a shift toward consolidation and application of existing findings rather than continued conceptual exploration. Second, academic focus may be diverging into adjacent or rebranded themes, such as digital resilience, educational equity in tech environments, or digital citizenship—thus reducing the visibility of "digital wellbeing" as a standalone keyword. Finally, it is important to note that the lower figure for 2025 is likely provisional, as that year is still in progress and many publications have not yet been indexed by DimensionsAI.

The observed publication trend reflects the rapid emergence, intensification, and partial stabilization of digital wellbeing as a research field in education. The spike in 2023 illustrates the urgency and relevance of the topic in light of pandemic-driven transformations, while the subsequent decline suggests a shift toward policy integration, intervention design, and long-term sustainability, marking a mature phase in the academic lifecycle of the concept.

4. Results

The bibliometric analysis conducted through CiteSpace revealed a structured yet diverse landscape of research surrounding digital wellbeing in school contexts. Using co-occurrence and clustering algorithms applied to the dataset retrieved from DimensionsAI, four distinct thematic clusters emerged. Each cluster represents a critical dimension in the evolving discourse on digital wellbeing, reflecting not only the multidisciplinarity of the field but also the interplay between psychological, technological, social, and institutional factors. These clusters offer a conceptual roadmap for understanding how digital wellbeing is defined, operationalized, and implemented across educational settings. They encapsulate a spectrum of concerns—from the internal psychological experiences of learners to the systemic conditions that shape equitable access to digital wellbeing resources.

4.1. Cluster 1: Digital Wellbeing and psychological development

Key Terms: *Digital wellbeing, mental health, emotional regulation, burnout, stress, resilience, autonomy, flourishing, motivation, engagement*

Cluster 1 foregrounds the psychological dimensions of digital wellbeing, particularly within the increasingly digitalized landscapes of education. It reflects a growing interdisciplinary concern—spanning educational psychology, mental health, and digital learning sciences—about the cognitive, emotional, and behavioral consequences of prolonged and pervasive digital engagement. Moving beyond narrow, technocentric perspectives that quantify digital wellbeing in terms of screen time or device usage, this cluster frames digital wellbeing as a dynamic, subjective, and context-sensitive psychological state, continuously shaped by one's interactions with digital technologies.

As conceptualized by Büchi (2024), digital wellbeing refers to a state of balance wherein the use of digital technologies enhances rather than disrupts one's psychological functioning and overall quality of life. This view highlights that digital wellbeing is not an incidental byproduct of using technology—it is something that must be intentionally designed for, both at the individual level (through self-regulation) and the institutional level (through supportive digital pedagogies and infrastructures). This emphasis challenges educational

institutions to take a proactive and systems-oriented role in safeguarding learners' psychological health in digital contexts.

In formal education, particularly during and after the COVID-19 pandemic, students and educators have become immersed in screen-mediated interaction—spanning learning platforms, communication tools, assessment dashboards, and productivity applications. This constant digital immersion has introduced risks such as cognitive overload, social isolation, and blurring boundaries between school, work, and personal life. These risks, in turn, have been linked to elevated levels of stress, anxiety, emotional exhaustion, and burnout, especially in online and hybrid learning environments.

For example, Blake et al. (2021) documented the psychological toll of continuous digital engagement on healthcare trainees during the pandemic. The study revealed that excessive screen exposure, lack of structured boundaries, and constant online monitoring led to symptoms such as irritability, attentional dysregulation, reduced motivation, and emotional withdrawal—clear indicators of psychological dysregulation exacerbated by poorly designed digital routines. These findings reinforce the idea that digital wellbeing is not simply about minimizing harm, but also about cultivating conditions that support emotional resilience, motivation, and psychological stamina.

A central construct within this cluster is emotional regulation, defined as the ability to monitor, evaluate, and modulate emotional responses to stimuli in adaptive ways. In digital learning environments, students frequently encounter emotionally charged feedback—such as grades, notifications, online comparisons, or social dynamics—which require metacognitive and emotional competencies to process effectively. Emotional regulation in digital contexts is therefore not incidental; it must be scaffolded through design features, supportive teacher practices, and learning cultures that promote reflection, self-awareness, and coping strategies rather than over-stimulation.

This is intimately connected to the need for autonomy—a foundational psychological need described in Self-Determination Theory (SDT) (Peters, Calvo, & Ryan, 2018). Autonomy refers to the sense that one's actions are self-endorsed and volitional. Digital tools that are overly controlling, prescriptive, or surveillance-based can significantly undermine this sense of control, leading to reduced motivation and increased psychological strain. In contrast, digital learning environments that allow students to personalize content, manage pacing, and

engage meaningfully tend to foster greater engagement and intrinsic motivation. Autonomy-supportive design is thus a cornerstone of psychologically informed digital pedagogy.

Closely related is the construct of resilience, or the capacity to recover from digital stressors, such as screen fatigue, technical glitches, or online criticism. In education, resilient learners are those who can sustain their motivation and self-efficacy even in the face of adversity. This resilience is not merely an individual trait but can be cultivated through supportive digital infrastructures, teacher feedback, social support systems, and access to mental health resources. Dennis (2021) expands this view through the concept of "online flourishing", which moves beyond coping to encompass a state of thriving—where learners feel purposeful, emotionally balanced, and socially connected in their digital lives.

Moreover, motivation and engagement, two pillars of educational psychology, are deeply embedded in digital wellbeing discourses. Motivation—whether intrinsic (driven by curiosity and interest) or extrinsic (driven by external incentives)—shapes students' willingness to participate in learning, while engagement reflects the depth and persistence of that participation. Peters et al. (2018) apply Self-Determination Theory to argue that digital platforms that support learners' needs for autonomy, competence, and relatedness foster sustainable motivation, thereby enhancing both academic success and emotional wellbeing. This evidence affirms that psychologically attuned design not only improves performance but also mitigates the emotional strain of digital schooling.

This entire perspective is strongly aligned with positive psychology, a field that emphasizes flourishing, strengths-based growth, and the pursuit of meaningful experiences. From this standpoint, digital wellbeing is reframed—not merely as the absence of harm (e.g., avoidance of distraction or anxiety)—but as the presence of positive psychological experiences, such as curiosity, connection, purpose, and joy in digital learning.

Cluster 1 establishes that digital wellbeing is fundamentally a psychological construct, intricately linked to how individuals process emotions, sustain motivation, engage with learning, and recover from stress in digital environments. It challenges educational institutions and digital tool designers to move beyond efficiency metrics toward the creation of emotionally intelligent, learner-centered, and resilient digital ecosystems. By addressing students' psychological needs through thoughtful design and institutional commitment,

educational systems can transform digital spaces from potential sources of strain into environments that foster human potential and mental flourishing.

4.2. Cluster 2: Educational technologies and learning environments

Key Terms: *Digital tools, learning platforms, scaffolding, self-control apps, adaptive systems, learning analytics, media literacy, digital storytelling*

Cluster 2 focuses on the design, deployment, and pedagogical integration of digital technologies within educational settings, placing specific emphasis on how these tools shape learners' cognitive, emotional, and psychological wellbeing. As education becomes increasingly digitized, scholars and practitioners alike are re-examining the role of digital tools—not merely as content delivery mechanisms but as affective, behavioral, and cognitive environments that mediate students' learning experiences in profound ways.

This cluster challenges the notion of digital tools as neutral conduits of information. Instead, it positions them as psychologically consequential environments that can either support or undermine learner development. The integration of digital technologies in education must therefore go beyond functional implementation and focus on their capacity to support attention regulation, emotional resilience, digital agency, and identity development. In this light, digital wellbeing becomes a key design outcome—one that must be embedded into the pedagogical architecture of platforms, tools, and learning systems from the outset.

A central theme emerging from this cluster is the use of adaptive scaffolding systems, which tailor instructional delivery to learners' individual cognitive profiles. Rooted in Vygotsky's sociocultural theory, scaffolding refers to the temporary support structures that enable learners to perform tasks just beyond their current abilities. In digital contexts, scaffolds are dynamically delivered based on real-time analytics and user data, offering strategic prompts, chunked content, and contextual feedback. This not only promotes personalized learning but also reduces cognitive overload—a psychological state in which information processing exceeds working memory capacity, often leading to confusion, disengagement, and digital fatigue.

For example, Alhalafawy et al. (2021) developed an Adaptive Mobile Scaffolding System that modulates content complexity based on students' cognitive styles (simplicity vs.

complexity). Their findings demonstrate that such systems enhance both academic performance and emotional comfort, highlighting the dual cognitive and psychological benefits of adaptive technology. By reducing informational friction and aligning tasks with learners' capacities, these systems foster a psychologically safe digital learning experience, where students are more likely to stay focused, persist through difficulty, and maintain intrinsic motivation.

Another critical area of focus in this cluster is the development of digital self-regulation tools—technological aids that help students manage their digital behaviors, attention spans, and emotional states. In online learning environments, where distractions are pervasive and boundaries between leisure and study are often blurred, learners report significant difficulty in managing screen time, maintaining attention, and resisting compulsive digital habits. Self-regulation tools such as dashboards, timers, nudges, and “do-not-disturb” modes function as external regulators of executive function, promoting digital discipline and self-awareness.

In a comprehensive review, Roffarello and De Russis (2023) demonstrated that digital self-control tools can mitigate compulsive digital behavior, enhance mindfulness, and reduce the cognitive costs of task-switching. In educational contexts, these tools are not merely behavioral interventions—they serve as psychological scaffolds that enable learners to monitor their own digital behaviors, reflect on their usage patterns, and make intentional decisions aligned with their academic goals and mental wellbeing.

Furthermore, this cluster underscores the transformative potential of co-designed educational systems, particularly those that engage adolescents in the design process. Participatory design—an approach grounded in principles of youth empowerment and human-centered design—ensures that digital platforms reflect the lived experiences, emotional needs, and usage behaviors of their intended users. Co-design not only increases the usability and relevance of digital tools but also contributes to digital identity development and psychological ownership, both of which are crucial for adolescent agency.

The DIGI-Teens project by Ceccarini et al. (2024) exemplifies this approach. By involving students in the creation of wellbeing-focused educational platforms, the project demonstrated that co-designed technologies are perceived as more authentic, trustworthy, and empowering. Students who felt heard and included in the design process reported greater

engagement, trust in technology, and emotional connection with their learning tools—outcomes that are central to digital wellbeing.

In addition to technological design, this cluster highlights the foundational role of media literacy education as a psychological safeguard in digital life. Traditional digital literacy—defined as the ability to access, navigate, and evaluate online information—is no longer sufficient in environments saturated with persuasive design, algorithmic curation, and emotionally manipulative content. Instead, media literacy for wellbeing must integrate critical thinking, emotional intelligence, attention regulation, and ethical reflection as core competencies.

Feerrar (2022) advocates for embedding digital wellbeing into media literacy curricula, arguing that students need to understand how interfaces, algorithms, and content strategies shape their thoughts, emotions, and behaviors. By teaching learners to recognize design nudges, persuasive patterns, and attention traps, educators can empower them to develop healthy digital boundaries, engage critically with media content, and make informed, values-driven choices about their digital practices.

From a psychological standpoint, the tools and systems discussed in this cluster function as external cognitive and emotional regulators, enhancing executive processes such as metacognition, attention control, goal-setting, and self-efficacy. These tools complement internal regulation by reducing digital clutter and supporting intentionality. The pedagogical frameworks embedded in these systems also reflect the principles of constructivist and experiential learning theories, offering learners contextualized, feedback-rich, and agency-driven pathways through digital content.

Ultimately, Cluster 2 represents a paradigm shift toward human-centered learning design in the digital age—an approach that integrates educational aims with psychological sustainability. It proposes that digital wellbeing is not a peripheral concern, addressed through isolated wellbeing modules or support services, but rather a core design principle that should permeate every aspect of digital learning architecture. Wellbeing-supportive design has the potential to reduce digital fatigue, enhance sustained attention, promote motivation, and build learner agency, all of which are foundational for academic success and mental health.

This cluster offers a compelling roadmap for the future of educational technology—one in which design, pedagogy, and psychology converge. By foregrounding wellbeing in the

design of digital tools, educators and developers can create learning environments that are not only engaging but also emotionally sustainable and mentally enriching.

4.3. Cluster 3: Social Contexts, Family Systems, and Identity

Key Terms: *Parental mediation, digital parenting, identity, social support, disconnection, family regulation, belonging*

Cluster 3 explores the social ecology of digital wellbeing, emphasizing the foundational role of interpersonal relationships and sociocultural environments in shaping how children, adolescents, and young adults experience and engage with digital technologies. Unlike approaches that focus solely on individual behavior or technological design, this cluster adopts a relational and contextual perspective, foregrounding the influence of parents, teachers, peers, and broader institutional and cultural systems in the development of digital habits, emotional safety, and identity formation.

This thematic orientation is deeply rooted in both developmental psychology and family systems theory, which collectively propose that wellbeing is not a fixed individual trait but an emergent outcome of ongoing, reciprocal interactions with one's environment. In this view, digital wellbeing is co-constructed within relational ecosystems—shaped by family routines, school policies, peer dynamics, and cultural values. It encompasses not only behaviors and outcomes but also perceptions, emotions, and identity processes tied to digital life.

A central concern in this cluster is parental mediation, defined as the range of strategies that parents use to regulate and support their children's digital media use. These strategies typically fall into three categories: restrictive mediation (e.g., setting time limits), active mediation (e.g., discussing content and use), and co-use (e.g., engaging together with digital media). More than simply a form of control, effective parental mediation fosters critical thinking, emotional awareness, self-regulation, and responsible digital citizenship.

In a recent study, Lafton, Wilhelmsen, and Holmarsdottir (2024) examined family dynamics in Norwegian households and found that digital parenting is a delicate negotiation between promoting opportunities and setting limits. Parents were seen balancing the educational and social benefits of digital engagement with concerns about screen time,

exposure to harmful content, and cyber risks. Crucially, their findings show that effective mediation is flexible, dialogical, and culturally sensitive—responsive not only to children's developmental stages but also to the evolving nature of digital ecosystems.

Closely intertwined with this is the concept of subjective digital wellbeing, which refers to how individuals perceive and evaluate their emotional states, sense of safety, and quality of interactions in digital spaces. Subjective wellbeing captures dimensions that are not always observable—such as perceived inclusion, agency, or digital stress—and can differ significantly from objective risk exposure.

In their international review, Holmarsdottir et al. (2025) found that many children, particularly from marginalized backgrounds, experience disparities between actual digital risks and perceived emotional safety. These gaps underscore the need for personalized, trauma-informed, and culturally responsive digital wellbeing strategies, particularly for learners who face intersecting challenges related to identity, socioeconomic status, or family instability.

Another important theme in this cluster is the role of digital environments in shaping personal and social identity, particularly during adolescence—a critical period for identity exploration, peer validation, and the formation of self-concept. Social media platforms, online forums, and digital learning environments now serve as primary arenas for identity performance, where young people test boundaries, seek feedback, and build social connections.

Lister et al. (2024) argue that positive digital practices—such as collaborative learning, online creativity, and participation in supportive digital communities—can enhance both academic self-concept and psychological resilience. When digital spaces are inclusive, affirming, and learner-centered, they foster a sense of belonging that directly contributes to motivation and wellbeing. Conversely, experiences of online exclusion, comparison, or harassment can erode self-esteem and reinforce feelings of isolation, particularly among youth with minoritized identities.

In a digitally saturated society, the ability to disconnect has emerged as a vital form of self-care and resilience. Disconnection, in this context, refers not to digital abstinence but to intentional, mindful boundaries that allow for emotional reset, cognitive recovery, and personal

reflection. It represents a new form of digital agency—one that emphasizes control over one's time, attention, and emotional availability.

Nguyen (2021) describes how individuals manage their presence in an "always-on" digital culture by practicing deliberate disconnection—such as turning off notifications, setting digital curfews, or designating screen-free zones. Similarly, Nguyen, Büchi, and Geber (2024) highlight that disconnection experiences are becoming central to how people achieve balance, especially in contexts where digital overexposure leads to fatigue, distraction, or anxiety. For children and adolescents, these practices must often be modeled by adults and reinforced through educational practices and institutional norms, making schools and families equally responsible in promoting balanced digital habits.

The theoretical backbone of this cluster includes Self-Determination Theory (SDT), which posits that relatedness, alongside autonomy and competence, is one of the three essential psychological needs for optimal functioning. Feeling emotionally connected, valued, and safe in digital environments is therefore crucial for digital wellbeing. Additionally, this theme resonates with Bronfenbrenner's ecological systems theory, which conceptualizes development as occurring within nested systems—from the microsystem of family and peers to the macrosystem of societal values and digital infrastructure.

From an educational standpoint, the implications are clear: digital wellbeing cannot be isolated within apps or content modules. It must be embedded into the relational culture of the school, involving whole-school policies, family engagement programs, teacher training, and community outreach. Policies must promote emotional safety, inclusivity, digital literacy, and participatory decision-making, especially for students who may otherwise feel excluded or invisible in digital contexts.

Cluster 3 articulates digital wellbeing as a socially embedded, ecologically mediated phenomenon. It underscores that wellbeing does not reside solely in the individual or the technology, but in the relationships, norms, and identities that shape digital experiences. Addressing this dimension of digital wellbeing requires multi-stakeholder collaboration, intergenerational dialogue, and identity-sensitive pedagogies—all aimed at fostering trust, connection, and resilience in the digital lives of young people.

4.4. Cluster 4: Policy, equity, and institutional readiness

Key Terms: *Inclusion, digital inequality, equity, policy, frameworks, institutional culture, teacher education, educational transformation*

Cluster 4 focuses on the macro-level and systemic dimensions of digital wellbeing, investigating how institutional cultures, policy frameworks, and leadership practices shape the conditions under which digital wellbeing can be effectively embedded, sustained, and scaled across educational systems. While the previous clusters examined psychological, technological, and social drivers of digital wellbeing, this cluster addresses the structural and governance-level mechanisms that define the operational reality of wellbeing in schools and universities. It asks a fundamental question: How can educational systems cultivate environments where digital wellbeing is not an afterthought, but a foundational pillar of inclusive and sustainable education?

At the heart of this cluster lies the concept of institutional readiness, which refers to the extent to which educational institutions—across early childhood, primary, secondary, and tertiary levels—possess the vision, infrastructure, and capacity to meaningfully support digital wellbeing. This readiness involves far more than access to hardware or connectivity; it includes leadership engagement, staff competence, organizational coherence, and policy alignment. In this regard, Biggins, Holley, and Supa (2022) introduced the Digital Learning Maturity Model (DLMM), a progressive framework for assessing how well institutions are integrating digital wellbeing practices. The DLMM outlines stages of development, from early awareness and pilot implementation to full integration and strategic leadership. It provides institutions with a roadmap to evolve from reactive, fragmented approaches toward comprehensive, embedded digital wellbeing strategies.

To ensure policies move beyond rhetoric, they must be institutionalized into the core culture of educational organizations. This requires a systemic alignment between policy documents and leadership behavior, professional development programs, incentive structures, and ongoing monitoring mechanisms. Schools and universities should transition from fragmented, one-off initiatives toward a whole-system model, in which digital wellbeing is embedded in curriculum design, classroom pedagogy, assessment policies, and staff wellbeing programs. In this vision, schools are understood as learning organizations—entities

capable of continuous reflection, adaptive transformation, and shared knowledge construction (Senge, 1990). As learning organizations, they engage in recursive cycles of inquiry, where feedback loops between student experience, staff engagement, and institutional practice guide sustainable improvement.

The case of Malaysia, as described by Abdullah, Mohd Zaidi, and Asar (2022), offers a compelling example of how institutional leadership and national policy alignment can catalyze meaningful change. In this context, digital wellbeing initiatives gained traction when school leaders internalized the value of wellbeing and provided resources, training, and recognition structures to support staff in implementing new practices. Their findings support a dual approach: top-down vision and bottom-up empowerment, where educators become not just policy implementers but active co-creators of wellbeing culture within their institutions.

This cluster also brings critical attention to the persistent challenge of digital inequality, a multifaceted issue that extends far beyond hardware access. Digital inequality encompasses variations in digital fluency, pedagogical quality, institutional support, and cultural responsiveness. Learners from disadvantaged backgrounds—whether due to geography, socioeconomic status, disability, migration, or linguistic barriers—often experience exclusion from digital learning environments, or face systemic barriers to emotional and psychological safety online. In these cases, digital wellbeing becomes not only a pedagogical concern but a matter of educational justice.

Devito et al. (2019) highlight the importance of socially inclusive design, showing how digital tools can be adapted to support marginalized communities such as LGBTQ+ youth, neurodivergent learners, and students with disabilities. These interventions must be participatory, context-sensitive, and culturally embedded to be effective. Similarly, Aljuboori et al. (2025) emphasize the need for culturally adaptive wellbeing interventions, drawing on their work in Saudi Arabia. They argue that effective design must incorporate local norms, values, and languages, reinforcing the principle that equity is not achieved through standardization, but through contextualization and responsiveness.

One of the most frequently cited gaps in digital wellbeing ecosystems is the lack of structured teacher training. Educators are often expected to model digital balance, facilitate emotional regulation in students, and integrate wellbeing into digital pedagogy—yet few receive the support or tools necessary for these complex tasks. Panesi, Bocconi, and Ferlino

(2020) underscore this issue through their work on the SELFIE framework, which provides schools with a structured self-assessment tool for evaluating their digital capacity and wellbeing culture. Their findings reinforce the need for inclusive, collaborative tools that empower teachers and school leaders to shape wellbeing strategies that are locally relevant and community-driven.

From a policy perspective, this cluster calls for coherent, systemic, and multi-level strategies that frame digital wellbeing as a public good and educational right, not a luxury or add-on. National ministries and regional authorities must develop policy frameworks that embed digital wellbeing throughout the educational pipeline, ensuring that it is integrated into teacher education programs, institutional accreditation standards, student services, and curriculum frameworks. These policies must be grounded in interdisciplinary research—drawing from psychology, education, digital humanities, public health, and technology ethics—to ensure both theoretical rigor and practical relevance.

A vital element of successful policy implementation is the presence of monitoring and evaluation mechanisms. These must extend beyond simplistic indicators of screen time or device use to include qualitative and contextual indicators: student engagement, emotional resilience, teacher confidence, classroom climate, and peer relationships. Feedback systems should include voices from students, families, and educators, ensuring that policies remain adaptive, participatory, and responsive to lived experience.

Crucially, policies must adopt an intersectional lens—acknowledging that digital wellbeing is not experienced uniformly. Race, gender, socioeconomic background, disability status, and geographical location significantly influence one's capacity to thrive in digital environments. Inclusive, equity-focused policy development ensures that digital wellbeing strategies are not only effective but also fair, just, and tailored to the needs of those most at risk of digital exclusion.

Finally, the findings in this cluster emphasize the need for strategic, long-term investment in digital wellbeing infrastructure, especially as part of broader post-pandemic recovery and educational transformation agendas. The COVID-19 pandemic illuminated systemic cracks in digital provision and exposed the fragility of institutional wellbeing strategies. Moving forward, funding must be directed toward mental health services, teacher

capacity-building, wellbeing-oriented digital curricula, and inclusive EdTech procurement—all designed to build digital ecosystems that promote not just access, but flourishing.

Cluster 4 underscores that digital wellbeing is not just a technological or instructional challenge—it is a governance and justice imperative. It requires whole-system readiness, bold leadership, and structural transformation to become embedded in the DNA of educational systems. Without these foundational supports, even the most innovative digital tools or interventions risk falling short. True equity in digital wellbeing demands that every learner and educator, regardless of background, identity, or location, is empowered to feel safe, connected, and capable of thriving in their digital environments.

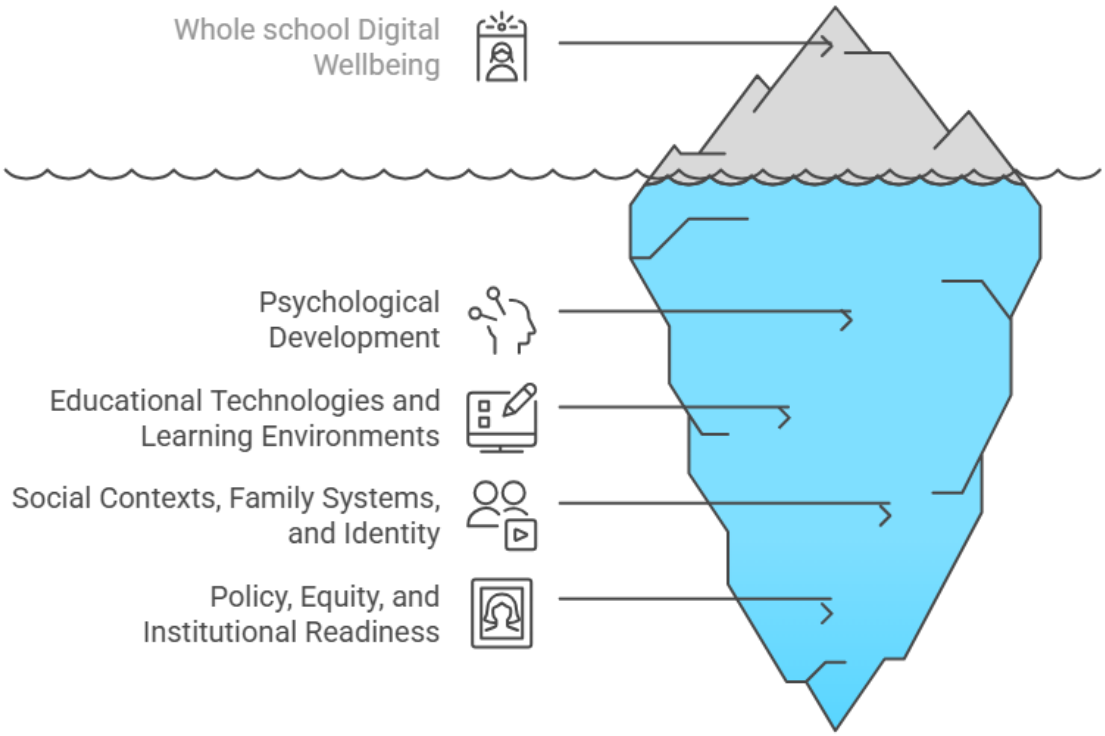

Figure 2 Iceberg of Whole school Digital Wellbeing

5. Discussions

The results of this bibliometric analysis provide a robust, evidence-based foundation for advancing the core objectives of the present Erasmus+ project, particularly those articulated in Work Package 2 (WP2). This package focuses on mapping research and school-level practices concerning digital wellbeing, identifying contextually grounded best practices, and co-constructing a scalable whole-school approach to digital wellbeing. The thematic

clustering emerging from the bibliometric data reveals a mature and multidimensional research landscape, shaped by interdisciplinary concerns spanning psychology, pedagogy, cultural systems, and educational governance.

The prominence of psychological constructs—such as emotional regulation, digital burnout, resilience, autonomy, and flourishing—across Cluster 1 reflects a growing scholarly consensus that digital wellbeing must be understood as more than mere screen-time management. Instead, it is a deeply embedded, affective and cognitive experience shaped by learners' interactions with digital tools and their broader psychosocial environments. The widespread application of Self-Determination Theory (SDT) and Positive Psychology within this cluster underscores the need for educational designs that promote autonomy, competence, and relatedness—core human needs that, when met, foster sustained engagement and mental health.

These theoretical insights provide a direct foundation for Activity T2.4, which centers on designing a comprehensive, evidence-informed digital wellbeing framework. The framework must prioritize mental health and psychological safety, ensuring that digital learning environments are not only efficient but also emotionally intelligent and learner-centered. In doing so, T2.4 can bridge the gap between psychological theory and practical intervention, grounding digital wellbeing in neuroscientifically and educationally validated constructs.

Cluster 2 emphasizes the instrumental role of educational technologies, including adaptive learning platforms, digital scaffolding systems, self-regulation apps, and feedback-rich learning analytics. The research consistently points to the critical importance of user agency, personalization, and co-design in promoting digital wellbeing. These technologies not only facilitate learning but serve as cognitive and emotional regulators that shape students' capacity for focus, reflection, and engagement.

These insights are invaluable for Activity T2.2, which aims to compile a compendium of best practices in school-based digital wellbeing. This cluster highlights that best practices are not merely technological "solutions" but pedagogically aligned, user-responsive tools that support student self-efficacy and healthy digital habits. Furthermore, the emphasis on participatory design calls for an active role for students in shaping their digital learning ecosystems, reinforcing values of inclusion, co-agency, and digital citizenship.

Cluster 3 expands the conceptual scope of digital wellbeing by examining the relational and ecological systems in which young people engage with technology. Drawing on family systems theory, developmental psychology, and identity formation research, this cluster foregrounds how interpersonal relationships—with parents, peers, and teachers—mediate digital behavior and emotional security. Key themes include parental mediation, peer influence, social belonging, and the subjective experience of safety and disconnection in online contexts.

These findings contribute significantly to both T2.2 and T2.3, especially in identifying culturally and socially mediated factors that influence digital wellbeing across national and local school systems. They reinforce the need for digital wellbeing strategies that extend beyond individual interventions to encompass whole-school cultures of care, including parent engagement, student voice, and community-led digital literacy initiatives. Schools must be seen not only as places of instruction but also as relational ecosystems where trust, identity, and psychological safety are nurtured.

Perhaps the most structural of all, Cluster 4 addresses digital wellbeing from a governance, equity, and institutional transformation perspective. Drawing on models such as the Digital Learning Maturity Model (DLMM), this cluster emphasizes that digital wellbeing must be supported by institutional capacity, visionary leadership, and equitable policies. The cluster exposes persistent gaps in teacher training, digital equity, and readiness across education systems—particularly among marginalized populations, such as rural students, learners with disabilities, and migrant youth.

These insights are directly aligned with the goals of Activity T2.3, which involves conducting national policy mappings and identifying enabling institutional conditions for digital wellbeing implementation. The findings call for a shift from reactive policy add-ons to structurally embedded, intersectional, and data-informed strategies that position digital wellbeing as a core element of educational quality, equity, and inclusion. Importantly, the cluster advocates for a vision of schools as learning organizations—dynamic entities that adapt to change through feedback, collaboration, and continuous professional growth (Senge, 1990).

Collectively, the four clusters form an integrated and mutually reinforcing framework. They reveal that digital wellbeing is a systemic, multi-level challenge—influenced by individual

psychological needs (Cluster 1), mediated through educational technologies (Cluster 2), shaped by social and relational contexts (Cluster 3), and conditioned by institutional policies and readiness (Cluster 4). This interdependence validates the project's whole-school approach and supports the creation of a digital wellbeing model that is holistic, inclusive, and sustainable.

The bibliometric results also offer a strategic roadmap for future project activities, especially as the consortium moves toward the design phase of the framework (T2.4). This phase must synthesize lessons from best practices (T2.2) and national systems (T2.3) with the psychological, pedagogical, and socio-political insights surfaced through this analysis. By doing so, the project can ensure that its outputs are not only grounded in current scientific discourse but also tailored to real-world educational contexts and capable of responding to the diverse needs of learners and educators.

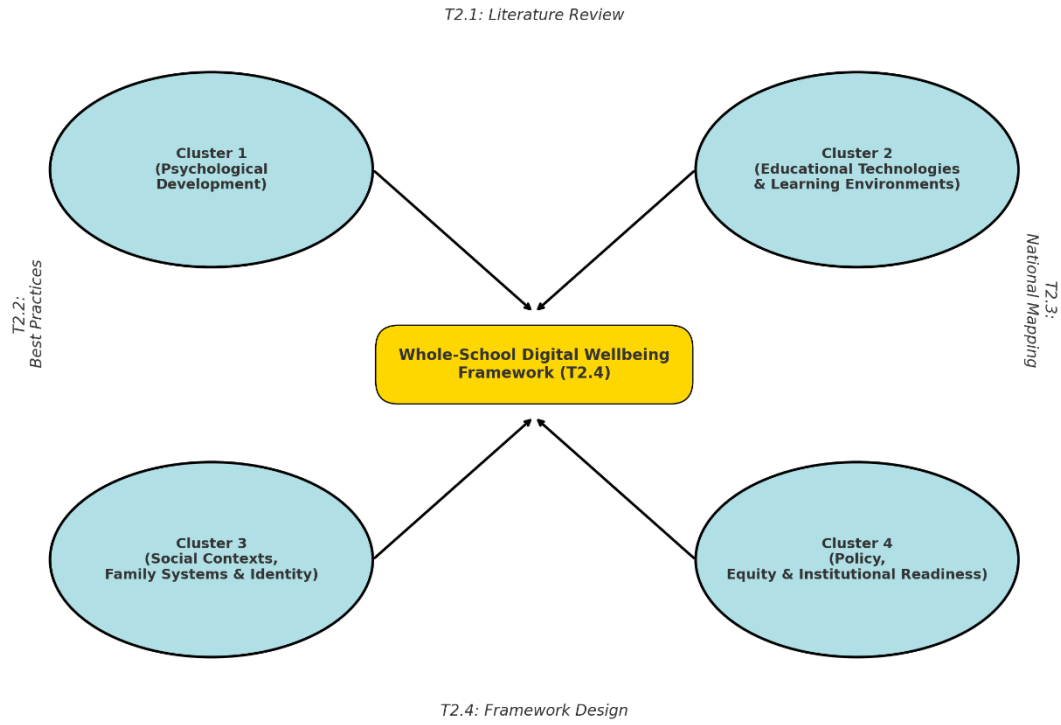

Figure 3 Conceptual integration of clusters into WP2 tasks

This conceptual diagram illustrates how the four thematic clusters identified through the bibliometric analysis directly inform and support the structure and objectives of Work

Package 2 (WP2) in the GLITTER project. Each cluster represents a critical dimension of digital wellbeing research:

- **Cluster 1 (Psychological Development)** highlights emotional regulation, motivation, autonomy, and resilience—providing the theoretical underpinnings for Activity T2.4, the design of the whole-school digital wellbeing framework.
- **Cluster 2 (Educational Technologies and Learning Environments)** informs Activity T2.2 through its focus on adaptive systems, self-regulation tools, and participatory learning platforms that promote healthy digital engagement.
- **Cluster 3 (Social Contexts, Family Systems, and Identity)** feeds into both T2.2 and T2.3 by emphasizing the relational ecology of digital wellbeing, including parental mediation, social belonging, and digital identity formation.
- **Cluster 4 (Policy, Equity, and Institutional Readiness)** aligns with Activity T2.3, offering structural insights into governance, digital equity, teacher training, and institutional maturity needed to embed wellbeing across educational systems.

At the center of the model is the **Whole-School Digital Wellbeing Framework (T2.4)**, which synthesizes insights from all clusters and is designed to guide systemic, sustainable interventions at both the school and policy level. The outer labels (T2.1–T2.4) map the flow of knowledge and practice across WP2 tasks, reinforcing the interconnected and evidence-based approach adopted by the project.

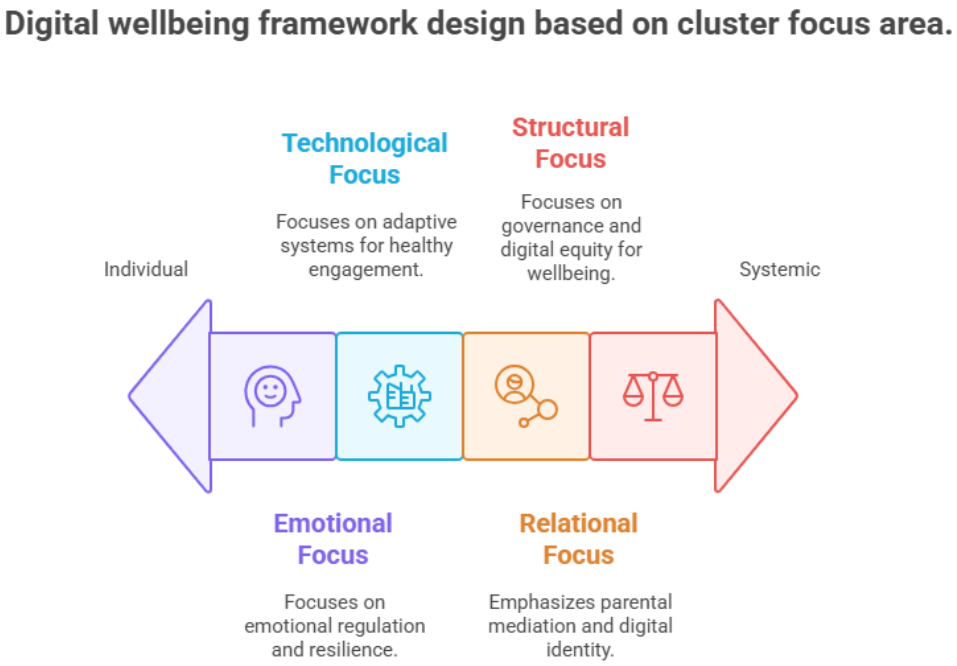

Figure 4 Digital wellbeing framework design based on cluster focus area

6. Conclusion

This bibliometric mapping provides more than a snapshot of academic trends—it delivers a strategic evidence base for the co-construction of digital wellbeing interventions in schools. It affirms the need for collaborative, interdisciplinary, and cross-sectoral action, where students, educators, policymakers, and researchers jointly define the future of digital learning environments. The data confirms that digital wellbeing is not an isolated concern but a complex educational challenge with deep psychological, technological, relational, and institutional roots. As such, it demands comprehensive, inclusive, and evidence-led responses that are capable of transforming schools into digitally safe, emotionally supportive, and future-ready learning spaces.

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