THE INFLUENCE OF EDUCATIONAL TECHNOLOGY ON WELL-BEING STATUS: A LITERATURE REVIEW

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Abstract

Undoubtedly, Information Technology (IT) has significantly expanded global educational accessibility. Extensive research underscores the need to examine how educational technology adoption affects the well-being of educators and learners, considering education's potential to enhance well-being and mitigate socio-economic challenges. This study aims to comprehensively review the impact of educational technology on human well-being in diverse educational contexts. Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, a systematic review encompassed databases such as Web of Science, Science Direct, SAGE, and Taylor and Francis. Thirteen selected articles underwent rigorous analysis. Findings reveal contextual variations in the influence of educational technology on well-being, with both positive and negative effects observed. In numerous contexts, a negative correlation between educational technology use and well-being is evident, exacerbated by insufficient training leading to stress among teachers and learners. Quantitative predominance in existing studies suggests a future shift toward qualitative or mixed-method approaches, offering deeper insights into the intricate relationship between educational technology and well-being across diverse settings. In conclusion, urgent interventions are needed to ensure equitable access to educational technologies and training. Such efforts should extend to least developed countries and small island developing states, fostering well-being enhancement and socio-economic progress through holistic technology integration in education.

INTRODUCTION

In an era characterised by rapid technological advancements and their pervasive integration into educational settings, the impact of educational technology on various facets of learning and development has become a subject of heightened interest and concern (Yeung, Carpenter & Corral, 2021). In recent years, institutions of both tertiary and secondary education (i.e., high schools, colleges, and universities) have perpetually endeavoured the integration of Information and Communication Technologies (ICTs) into the classroom setting because of its reputed benefits for students and teachers (King & Boyatt, 2015). Conducting a comprehensive systematic literature review on the influence of educational technology on well-being status is not only a timely endeavour but also a vital one. The complex interrelationship between technology use and well-being outcomes necessitates an in-depth exploration of existing research to elucidate both the positive and potential adverse effects.

The dynamic interplay between educational technology and student well-being has emerged as a pivotal area of investigation within the realm of educational research. As the educational landscape continues to evolve in response to technological innovation, understanding the nuanced relationship between technology-enhanced learning and well-being status assumes paramount significance (Voogt & Roblin, 2012; Vanderlinde, Aesaert, & Van Braak, 2015). According to Uslu and Usluel (2019), the integration of ICTs into the classroom setting does not only bring about benefits, rather, technology integration into the classroom is also associated with numerous challenges.

Educational technology, encompassing a spectrum of digital tools, platforms, and applications designed to enhance pedagogical strategies and learning outcomes, has witnessed widespread adoption across educational institutions worldwide. Previous studies have concluded that the use of technology and associated devices for teaching and learning purposes can affect teachers' well-being (Fernández-Batanero, Román-Graván, Reyes-Rebollo, & Montenegro-Rueda, 2021), and the well-being of the learners (Mourlam, DeCino, Newland & Strouse, 2020; Haq & Abdullah, 2012). The incorporation of technologies in education may raise concerns pertaining to the well-being of both teachers and students as they battle to keep-up with technological challenges which in turn affect their well-being (Fernández-Batanero et al., 2021).

As educators, policymakers, and stakeholders in secondary education seek to optimise the benefits of educational technology, it becomes imperative to systematically assess its implications on students' psychological, emotional, and social well-being. The introduction of ICTs has broader effects on the well-being of the people and the country by facilitating the improvement of various social issues, such as social capital, education and employment (Ganju, Pavlou & Banker, 2016). Kaye (2017), Mourlam, Strouse, Newland and Lin (2019) posit that the introduction of computers and related technologies demanded a shift from traditional to technologically enhanced learning methods. This

major shift has had a huge impact on the well-being of both learners and teachers due to the influence of ITCs in modern-day pedagogy.

Within the higher education context, ICTs development has allowed university lecturers to incorporate a variety of digital tools to enhance pedagogy. For example, some universities introduced library-management systems (Chen, Islam, Gu, Teo & Peng, 2020), while some went as far as using Virtual Reality devices to improve overall learning outcomes (Yuz, 2021). As a consequence, educators are poised to capitalize on the potential of educational technologies, seamlessly integrating these digital resources into the educational journeys of children in ways that align with their developmental stages. The integration of technology is envisaged to not only facilitate but also amplify the learning process while contributing positively to overall human well-being (Murphy et al., 2019). Beyond its impact on well-being, the utilisation of ICTs also paves an avenue for extending educational access to underserved communities that might otherwise be devoid of such opportunities (Ganju et al., 2016).

Theoretical framework on well-being

In the context of this study, the foundational theoretical framework underpinning well-being delineates its composition through a duality of objective and subjective evaluations (Tiberius, 2013). Tiberius (2013) elucidates five primary theories that categorize well-being as either subjective, encompassing elements perceived as beneficial, such as hedonism (Bradley, 2015), desire fulfillment (Griffin, 1986), or life satisfaction (Sumner, 1996), or objective, grounded in elements instrumentally advantageous, such as the realization of human nature (Nussbaum, 2011) or individually driven nature fulfillment (Haybron, 2011). Correspondingly, this viewpoint finds reinforcement among other scholars who posit that well-being encompasses quantifiable facets rooted in the societal dimensions of contemporary progress (Ivković et al., 2014).

Furthermore, Diener and Suh (2013) substantiate the multifaceted nature of well-being, categorizing it into two dimensions: subjective and objective approaches, each contributing unique insights. Likewise, Maluleke and Edoun (2022) propose a paradigm shift in well-being assessment, transcending its historical economic determinants to encompass broader dimensions linked to poverty and a shift from means-based analysis to a focus on outcomes. Importantly, the Organisation for Economic Co-operation and Development’s (OECD) report, "How's Life?" (2020), underscores the profound influence of well-being on individuals' achievement prospects, unveiling pronounced disparities in quality of life, life expectancy, and happiness, particularly when education becomes a pivotal consideration.

Within the framework of this conceptual model, encompassing the dual perspectives of well-being, Thorburn (2020) observed the existence of a "middle-path version of well-being" that harmoniously blends intrinsic and instrumental aspects, along with the convergence of subjective and objective elements. This comprehensive approach holds

potential to address the imperative of enhancing subject teaching and personal well-being. In light of this nuanced well-being paradigm and its significance for societal progress and sustainability, it becomes paramount to integrate the well-being of teachers and students – the future stewards of society – into both national and international policy considerations.

Moreover, the role of education in augmenting societal subjective well-being is accentuated, particularly in instances where the monetary benefits of education minimize its overall value (Wang & Sohail, 2022). Embracing a well-being theoretical framework assumes heightened significance, as policy makers display a growing inclination towards modern developmental paradigms that emphasise the assessment of both community and individual quality of life (Gardener, 2017).

Furthermore, the well-being discourse frequently employs terms like well-being, happiness, prosperity, quality of life, and life satisfaction interchangeably (McGillivray & Clarke, 2006; Maluleke & Edoun, 2022). OECD (2020) categorizes these definitions into three primary groups, one of which pertains to a component-based definition of well-being, where diverse dimensions and constituent elements are deemed crucial for well-being assessment. While the absence of a universally accepted definition of well-being remains a recurring theme in prior research (Camfield, Crivello & Woodhead, 2008), a consensus emerges among experts and individuals globally, underscoring the need to address fundamental human needs and achieve life satisfaction while pursuing personal aspirations (OECD, 2020).

The interaction between educational technology and well-being

Over the recent decades, a marked escalation has been observed in the integration of technology within the classroom environment, primarily attributed to the manifold advantages it offers to both educators and learners. Nevertheless, it becomes evident that the assimilation and utilisation of technology frequently correlate with weakened levels of well-being among both educators and learners, as they grapple with the perpetual challenge of staying abreast of rapidly evolving technological paradigms (Fernandez-Batanero et al., 2021; Tai, Ng & Lim, 2019). A large body of recent literature have reported similar findings with regards to the inverse relations between technology use and online education. In their mixed-methodology and bibliometric analysis study involving university teachers, Navarro-Espinosa, Vaquero-Abellán, Perea-Moreno, Pedrós-Pérez, Aparicio-Martínez, and Martínez-Jiménez (2021) found that previous technology training and other behavioural factors were key variables contributing to the prevalence of stress among university teachers during the COVID-19 pandemic. This association is also reported in a similar study (Uslu & Usluel, 2019). Their research aim was to propose a conceptual framework for classifying ICT use in education and to further develop a structural with the aim of explaining the technology integration in Turkish schools. Their findings showed that teachers' pedagogical skills played a critical role in the integration process (Uslu & Usluel, 2019).

On the contrary, other authors such as Haq and Abdullah (2012) reported contradictory findings. In a study involving secondary level children, the results suggested that using Information Technology in online education platforms had a positive effect children's' well-being. The main limitation to Haq and Abdullah's (2012) findings is that it only focused on the subjective approach of measuring well-being which, as stated previously, has many limitations. Mourlam et al. (2020) contend that within the context of historical impediments to the integration of educational technology in schools, children exhibit a nuanced perspective, recognising technology's potential to yield both adverse and beneficial impacts on their well-being.

According to Wang and Sohail's recent study (2022), there exists a substantial and noteworthy long-term correlation between ICTs and education. This connection underscores the significance of technology integration in the educational domain, a matter of notable importance for policymakers. It not only positively impacts teachers' contentment but also contributes significantly to the overarching concept of sustainable development, as observed by Frugoli, Almeida, Agostinho, Giannetti, and Huisingh in their 2015 research. Given this backdrop, an imperative arises to systematically explore the ongoing research landscape concerning the nexus between well-being and educational technology. This entails a comprehensive review across diverse databases including Web of Science, Science Direct, SAGE, and Taylor and Francis. The overarching objective is to synthesize the primary discoveries and emergent research avenues. This synthesis seeks to enhance our comprehension of effective strategies for both educators and learners to proficiently manage their well-being amidst the utilization of technology for educational purposes.

The rationale for this study stems from the acknowledgment that the evolving technological landscape within the educational setting introduces novel challenges for both teachers and students. These challenges, in turn, have direct implications for their overall well-being, which subsequently reverberates onto educators' instructional efficacy, scholastic accomplishments, the learning process, and their individual belief in their teaching capabilities within the classroom milieu. It is noteworthy that research pertaining to the role of technology in education has predominantly concentrated on ameliorating students' learning experiences. In contrast, the examination of how these technological interventions influence teachers' daily pedagogical routines remains a relatively underexplored domain. Through a comprehensive amalgamation of empirical studies, theoretical frameworks, and methodological approaches, the present study aspires to scrutinize the multifaceted impact of educational technology on the well-being status of educators and learners across diverse educational settings.

METHODS

Search Strategy

This study is underpinned by a systematic review of the existing literature, systematically conducted through the utilisation of renowned databases, namely, Web of Science, Science Direct, SAGE, and Taylor and Francis. The selection of these databases is predicated upon their stature as extensive repositories of peer-reviewed scientific literature, housing a plethora of bibliographic references and abstracts. Our approach to this literature review has been thoughtfully confined, concentrating exclusively on recent contributions. This delineation is manifest in the study's inclusion criterion, encompassing journal articles released within the past decade (January 2012 – December 2022). To facilitate a nuanced exploration, we strategically deployed a set of pertinent search terms and keywords, encompassing themes such as well-being, educational technology, stress, ICT, teachers, and learners. Augmenting the comprehensiveness of our study, we competently integrated the reference research's bibliography, encompassing thirteen (13) peer reviewed articles. The precision of our search process was fortified through the strategic application of Boolean operators (OR/AND) and the judicious utilisation of the "intitle:" parameter, thus underscoring the rigor inherent in our quest for appropriate literature.

For this study, we conducted the systematic review in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement guidelines (McInnes, Moher, Thombs, McGrath, Bossuyt, Clifford & Willis, 2018). Because this study is descriptive and qualitative, we employed semantic applications to the analysis of social networks through visual representation using VOSviewer software. Among the many benefits of the VOSviewer software is the mapping features through network visualisation. The network visualisation feature provides an overview of the mapping between interconnected keywords along with the magnitude of the keywords depicting the number of researches done on these terms. Each keyword described can be connected to more than one other keyword, which shows the determination of the keyword on the research topic under study.

Inclusion and Selection Criteria of studies

For the purpose of this study, articles were selected for inclusion in the review if the following inclusion criteria were met: (a) published in peer-reviewed journals, (b) were published in the last 10 years, (c) written in English, (d) the study explored the relationship between well-being of teachers or learners and the use of educational technology, (e) the study includes instruments to measure well-being (or well-being related variables) and other education-related variables.

Regarding the fourth criterion, articles reporting on well-being of children or teachers at school level were also considered for inclusion. Regarding the fifth criterion, studies reporting on technostress relating to technology use were also considered for inclusion. Studies were excluded if:

1. They were divergent from the realm of technology integration within education.
2. If the full text was not accessible on the specified databases.
3. If they were book chapters, books, conference proceedings and any other formats deviating from the purview of standard peer-reviewed articles.

During the first search, considering the inclusion criteria, a total of 183 records were retrieved from the selected databases (47 from Web of Sciences, 59 in SAGE, 33 in Science Direct and 44 in Taylor and Francis). In addition, we also reviewed the reference lists of the selected journal articles. Duplicate records were discarded as they did not meet the criteria. Figure 1 shows the distribution of the number of articles published between 2012 – 2022 period in the databases analysed.

In the initial phase of exploration, adhering to the established inclusion parameters, a comprehensive collection of 183 entries was gathered from the designated databases. This assortment comprised 47 submissions from Web of Sciences, 59 emanating from SAGE, 33 within the domain of Science Direct, and 44 sourced from Taylor and Francis. Moreover, our meticulous approach encompassed a meticulous survey of the bibliographies accompanying the chosen journal articles. It is imperative to note that redundancies were purged from consideration, owing to their incongruence with the outlined criteria. The graphical representation of this article yield, spanning the temporal expanse of 2012 to 2022, is eloquently illustrated in Figure 1, attesting to the distribution across the analysed databases.

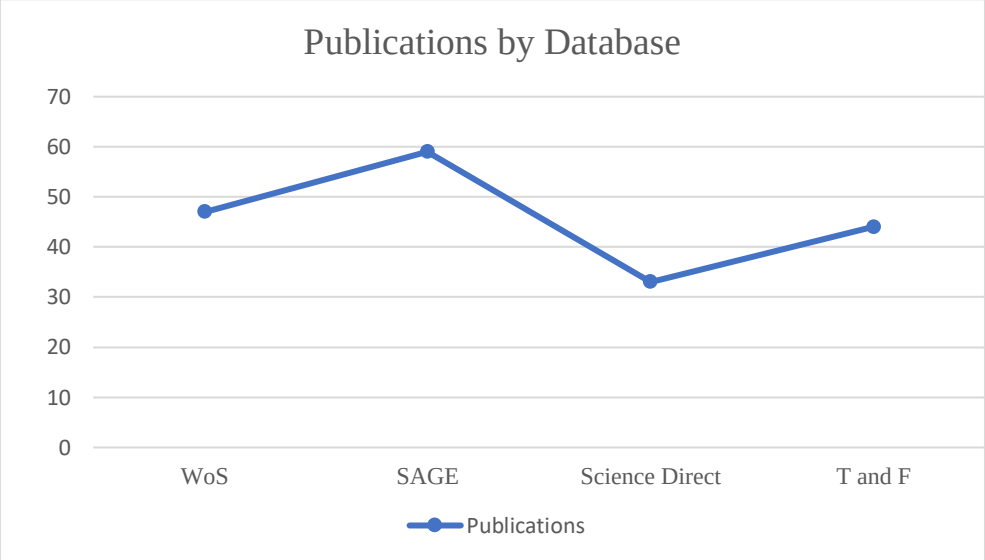

Figure 1. Distribution of publications by database.

The data in Figure 1 indicates the number of published articles with regard to the influence of educational technology on well-being status over the last 10 years. It is apparent from Figure 1 that from our search criteria, there has been a greater interest in the subject from 2016. After removing duplicates and excluding records for abstract and title, 13 articles were retrieved. Figure 2 shows the flow chart of the study selection and sampling process.

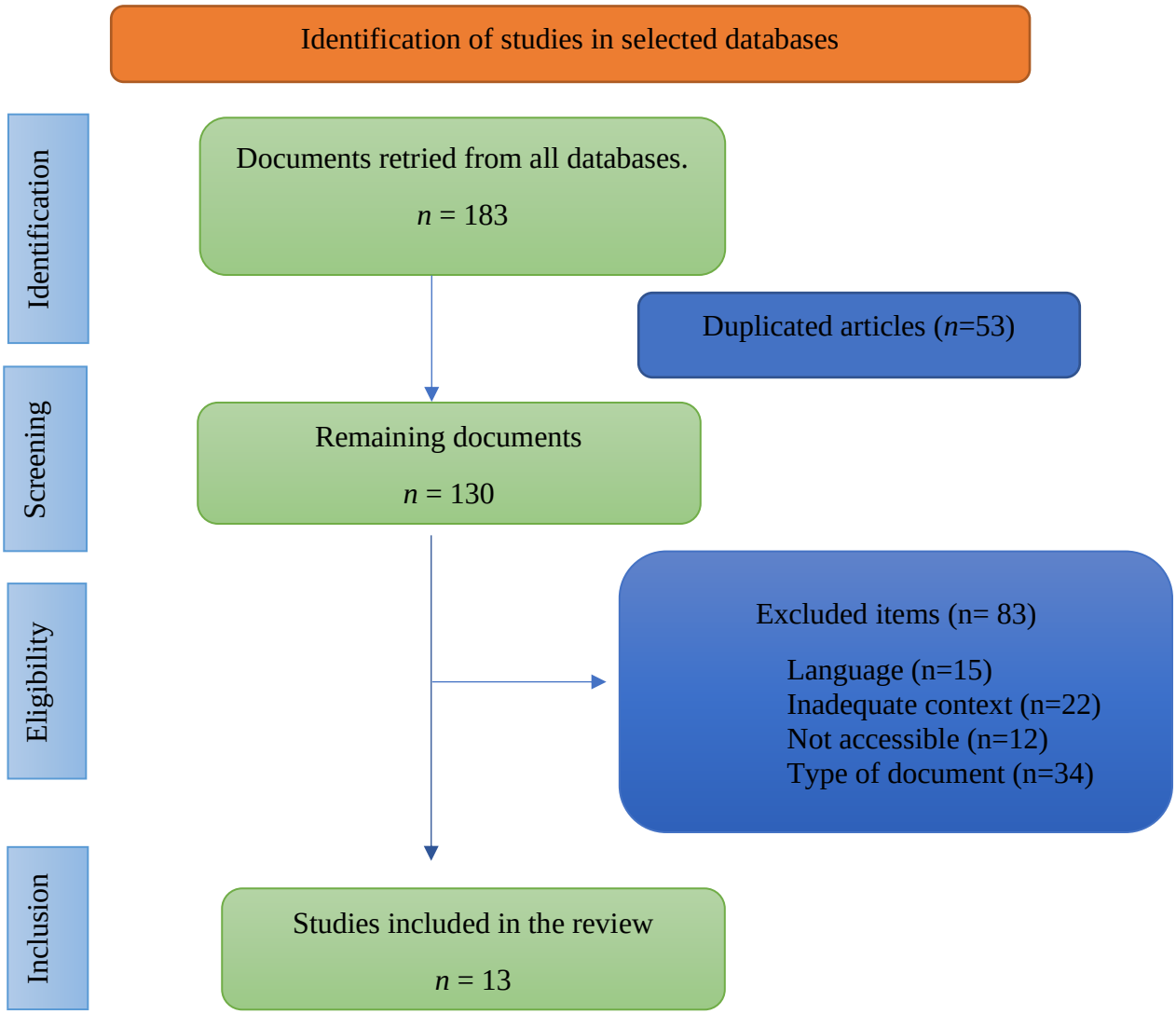

Figure 2. Flow chart of sampling and selection process

Data extraction

We performed a content analysis of articles included in this review from the identified databases. Table 1 shows a summary of the analysis of the 13 articles included in the review as per the inclusion criteria.

Table 1. Overview of studies selected for review

Study	Year	Publisher	Methodology	Main findings
Fernández-Batanero, Román-Graván, Reyes-Rebollo, & Montenegro-Rueda,	2021	International Journal of Environmental Research and Public Health	Qualitative	The utilization of technology is correlated with elevated levels of stress and anxiety among educators.
Yu, Z	2021	Interactive Learning Environments	Quantitative	The use of VR technology exerts a significant positive influence on educational outcomes and affects well-being
Mourlam, D.J., DeCino, D.A., Newland, L.A. and Strouse, G.A.	2020	Computers and Education	Qualitative	Educational technology, as perceived by children, evokes a dual spectrum of effects encompassing both positive and negative dimensions on their overall well-being.
Ribeiro-Silva, E., Amorim, C., Aparicio-Herguedas, J.L. and Batista, P.	2022	Frontiers in Psychology	Qualitative	The use of technologies and incorporation of physical activities benefit students' well-being
Ganju, K.K., Pavlou, P.A. and Banker, R.D.,	2016	MIS quarterly	Quantitative	The use of ICT predicts well-being in specific countries. In developing countries, the use of smartphones in education increases well-being.

Study	Year	Publisher	Methodology	Main findings
Wang, Z. and Sohail, M.T.	2022	Frontiers in Psychology	Quantitative	Positive association between technology use and education which contributes to higher subjective well-being in the long- run
Zee, M and Koomen H.M.Y	2016	Review of Educational Research	Quantitative	Technology Self-Efficacy exhibits a positive correlation with diverse facets of the educational landscape, encompassing students' adept adaptation to the academic setting, the varying dynamics characterising teacher conduct, and the patterns underpinning teachers' psychological well-being.
Kausik NH and Hussain D	2021	Journal of Education	Quantitative	Students without Learning Disabilities manifest elevated scores in realms encompassing academic motivation, academic self-efficacy, and well-being in contrast to their counterparts grappling with Learning Disabilities
Gunathilaka C, Wickramasinghe R.S and, Jais M	2022	International Journal of Educational Reform	Quantitative	Investing in digital competence augments educational success and contributes to psychological well-being.
Halliday A.J, Kern M.L, Garrett D.K & Turnbull D. A	2019	Educational Action Research	Qualitative	Students' involvement in school's positive education planning allows schools to better understand their well-being.
Hietajärvi, L., Salmela-Aro, K., Tuominen, H., Hakkarainen, K. & Lonka, K.	2019	Computers in Human Behavior	Quantitative	"Students' digital activities reflect multiple dimensions that are differently related to academic well-being."

Study	Year	Publisher	Methodology	Main findings
Bergdahl, N.	2022	Computers and Education	Qualitative	Teachers' understanding at micro and macro level engagement reported a variety of engagement and disengagement at different levels.
Xia, Q., Chiu, T.K., Lee, M., Sanusi, I.T., Dai, Y. and Chai, C.S.	2022	Computers & Education	Quantitative	The focus on needs satisfaction could engage learners and improve their well-being in AI learning.

FINDINGS AND DISCUSSION

Findings

We present the results of the study in two phases. First, we describe the results obtained from the journal articles retrieved from the selected databases, and thereafter, we present the results using a visual representation of the analysis using keyword graphs extracted from the selected databases with the aim of extracting the main trends when evaluating the influence of educational technology on the well-being of students and teachers. For the purpose of this study, we identified and only include for review thirteen journal articles that were published between 2012 – 2022. As evident form Table 1, the majority of publications were published from 2016 onwards. This is an indication of the significant attention paid to research pertaining to well-being and educational technology.

Our study unfolds in a dual-phase manner. Initially, we expound upon the outcomes derived from the journal articles obtained via the designated databases. Subsequently, we pivot to a visual exposition of the analysis, employing keyword graphs extracted from these databases. This visual representation is undertaken with the intent of elucidating predominant trends suitable to the evaluation of educational technology's impact on the well-being of both students and educators. For the purpose of this study, a meticulous process yielded the identification and inclusion of a subset of thirteen journal articles that were published between 2012 – 2022, for comprehensive review. The tabulated data in Table 1 underscores that the majority of these scholarly contributions emerged post-2016, serving as a compelling testament the significant attention paid to research pertaining to well-being and educational technology.

Description of the Studies Examined

The studies considered for this literature review shared the objective of investigating the influence of educational technology on the well-being of students and learners. "More precisely, the studies included in this review focused on the impact of the use of

technology in various educational settings and its effect on well-being of teachers and learners." Numerous studies have reported the expected benefits of technology adoption in the classroom setting. However, many of these studies found that the challenges accompanied with the integration of technology in various teaching and learning settings affect the well-being of students and teachers alike. For example, Mourlam et al. (2020) analysed learners' perceptions of school-based technology and its role in the well-being of learners. Their findings discovered that the use of school educational technology had both negative and positive effects on the well-being of learners. In addition, they found that challenges associated with technology integration into the classroom were more apparent due to the historical challenges relating to school educational technology adoption.

With regards to the use of digital tools for online learning purposes, Bergdahl (2022) explored how Swedish teachers perceived and understood student online engagement and disengagement. Bergdahl (2022) employed a Mixed Method Grounded Theory study using interview-diary method as an intervention among 10 teachers who regularly taught using either hybrid, remote or distance classes pedagogical methods. Their results demonstrated that teachers' understanding at micro and macro level engagement reported a variety of engagement and disengagement at different levels. Likewise, in a parallel method of inquiry, Hietajärvi et al. (2019) delved into the divergences characterizing the socio-digital engagement strategies of young individuals. Employing a quantitative framework, their investigation meticulously scrutinized the distinctions in socio-digital participation across three distinct cohorts of Finnish students, spanning the scope from elementary school to high school and higher education. This exploratory study aimed to ascertain the intricate interplay between these dissimilarities and the underpinnings of students' academic well-being. Their empirical study revealed a multifaceted landscape of digital activities, each exhibiting distinctive linkages to the various dimensions relating to academic well-being.

The introduction of modern technological education into the classroom is great way to improve overall learning outcomes. In their meta-analysis study, Yu (2021) "investigated the effect of Virtual Reality (VR) technology on educational outcomes of various components. Their study found that the use of VR technologies exerts a strong and positive influence on educational outcomes" but cautioned that the use of these technologies could have a significant negative impact on anxiety. In Australia, Halliday et al. (2018) conducted a Participatory Action Research (PAR) study on student involvement in education planning and its impact on student well-being. Their qualitative study – carried out with a sample of 10 students found that student involvement allowed the school to better understand the well-being of students. Their findings further revealed that students were open to technology in their learning provided that the educational technology adopted did not involve reading too much on the screen.

In a separate study, Xia et al. (2022) adopted the Self-Determination Theory (SDT) as their conceptual framework to expound upon the dimensions of student engagement through the lens of fundamental psychological needs. This framework underscores the

attainment of student engagement and well-being by addressing the pivotal psychological requisites of autonomy, competence, and relatedness. Executing a 2 x 2 research design, their study centred on a cohort of students (n= 128) partaking in an AI program within a secondary school context. The research outcomes shed light on the efficacy of prioritizing need satisfaction as a strategy to cultivate engagement not only across gender lines but also among students with diverse levels of academic achievement. Notably, their empirical insights underscored a symbiotic relationship between enhanced engagement and perceptions of content relevance, bolstered confidence, and a fortified motivation to pursue AI studies with increased vigor.

Furthermore, Ganju et al. (2022) conducted a comprehensive inquiry into the nexus between ICT and national well-being. Their study adopted an exploratory approach, meticulously interpreting an array of country-specific and ICT-specific variables. Their findings revealed the discernment of distinct patterns characterizing the relationship between ICT utilization and well-being across different nations. Importantly, their investigations unveiled a nuanced reality, highlighting that the increase of national well-being through ICT deployment doesn't follow a uniform trajectory across all countries. Notably, their research unveiled a fascinating discrepancy: while less developed nations primarily elevate their well-being levels through mobile phone usage, their developed counterparts achieve similar goals through various ICT systems.

In a parallel scholarly pursuit, Gunathilaka et al. (2022) embarked on an examination of the intricate interweaving of digital literacy, psychological well-being, and the efficacy of remote teaching and learning amid the emergence of the COVID-19 pandemic. Their quantitative study rigorously probed the transformative impact of remote education, illuminating the consequential strains experienced by educators. Equally noteworthy, their empirical study underscored a significant connection between digital literacy and the psychological well-being of teachers, where the former exerted an apparent negative influence on the latter.

In another study, Kausik and Hussain (2021) “explored the impact of inclusive education on academic motivation, academic self-efficacy and well-being of students with learning disability.” Kausik and Hussain “made a comparison between students with learning disability studying in special schools, students with learning disability studying in inclusive schools and students without learning disability in inclusive schools.” Their study compared these categories of students with a set of variables (i.e. academic motivation, academic self-efficacy and well-being). The outcomes of their investigation unveiled noticeable disparities, where students lacking learning disabilities showcased elevated scores in domains of academic motivation and academic self-efficacy. Moreover, a notable divergence surfaced as students without learning disabilities exhibited higher well-being levels in contrast to their counterparts grappled with such disabilities. Similarly, Zee and Koomen (2016) employed a criterion review approach and synthesized research conducted over a period of 40 years focusing on Teacher Self-Efficacy (TSE) with the intention of exploring the consequences of TSE for the quality of classroom processes and teacher psychological well-being. Their review study pointed

out that TSE is positively linked to students' academic adjustment and factors underlying teachers' psychological well-being. By contrast, a negative relationship between TSE and well-being related factors was reported. Zee and Koomen (2016) also added that their findings were corroborated by a small number of previous studies which reported indirect effects between TSE and psychological well-being through classroom organisation.

Analysis of the papers included in the review using VOSviewer

Additionally, we harnessed the analytical capabilities of VOSviewer and Microsoft Excel software tools to conduct citation analysis and scrutinize the co-occurrence patterns of terms and words. When investigating the dimensions of learner and teacher well-being alongside the stressors stemming from the utilization of educational technology, a comprehensive examination of the reviewed literature surfaced noteworthy insights, as depicted in Figure 3. Notably, the identified factors predominantly converge around the realms of remote pedagogy and learning, underscored by the pivotal significance of digital skills and competence. Furthermore, a pronounced interlinkage with emotional health and well-being within the educational technology landscape was also distinctly distinguished.

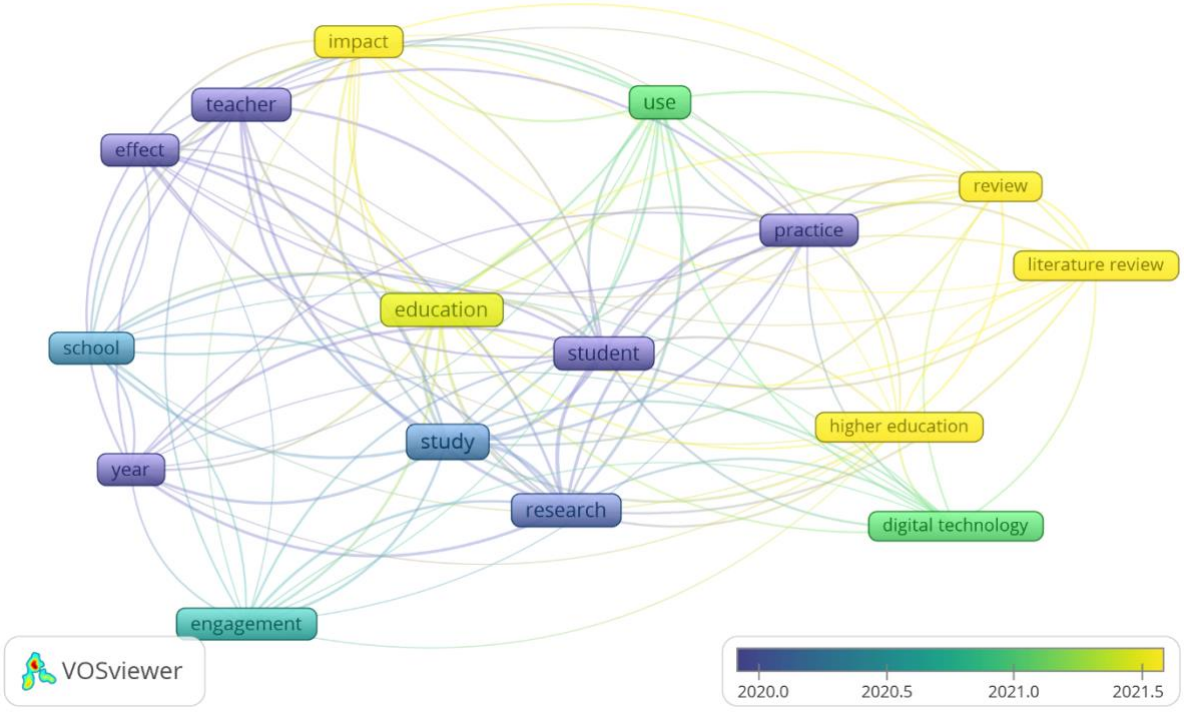

Figure 3. Bibliometric map of the 16 KeyWords Plus (KW+) representation

Upon completion of the comprehensive descriptive and quantitative analysis encompassing the designated documents, the findings were meticulously assessed. The relationships interwoven amongst the distilled keywords, as facilitated by the KeyWords

(KW+) tool across disparate databases, were subsequently elucidated through the utilization of the VOSviewer software. In congruence with this analytical trajectory, the aggregation of thirteen distinct studies, spanning the timeframe 2012 to 2022, were analysed. This collective body yielded a cumulative pool of KW+. The specifics of these relationships were vividly captured and illustrated in Figure 3, manifesting as a dynamic network visualization or cluster predicated upon the underpinning KW+ similarity outlines.

The visual narrative portrayed within this network is inherently saturated with significance. The scale of each individual circle or node assumes proportionality to the keyword's salience within the purview of this review. Concurrently, the interconnecting links between these nodes competently mirror the complex relationships binding them. In this interpretive exercise, a cumulative tally of 16 distinct KW+ was distinguished, underscoring the depth and extensiveness of this analytical investigation.

Discussion

This study presents the results of studies pertaining to the influence educational technology on the well-being of teachers and learners in different educational contexts. In this study, we focused on studies that were published between 2012 – 2022 in the following databases: Web of Science, SAGE, Science Direct, and Taylor and Francis. These databases were chosen due to them being the largest databases of bibliographic references of peer reviewed academic literature. The studies analysed demonstrate that majority of the work published in this field employed the quantitative approach methodology, whilst only a small number of studies employed the qualitative methodology. This phenomenon suggests that future research should analyse the influence of educational technology through qualitative methods or mixed methodology approaches. The predominantly quantitative nature of the studies reviewed highlights the potential for future investigations to embrace qualitative methods or mixed methodology approaches. By delving into qualitative analyses, a deeper understanding can be gained, unraveling intricate correlations between educational technology usage and the well-being of both learners and educators across varying contexts. This approach could be particularly insightful for uncovering nuances in countries where the adoption of educational technology might be associated with lower levels of well-being.

The use of technology for teaching and learning purposes has generated a great interest in the past two decades. As technology continues to reshape educational landscapes worldwide, it becomes imperative to expand research horizons beyond developed nations. The existing disparities in attention towards the influence of technology on well-being status in developing countries warrant focused exploration. Future studies should thus prioritize examining the rate of technology adoption and its resultant impact on the well-being of both teachers and learners within these evolving educational frameworks. However, some researchers argue that this field need to be expanded as more countries adopt the digitization of the teaching and learning environment (Gunathilaka et al., 2022). The findings suggest that research pertaining to the influence of technology on well-being

status in developing countries have received far less attention when compared to developed nations. This suggests that future research should analyse the rate and effect of educational technology adoption and its impact on the well-being of teachers and learners in developing and less developed countries.

Studies in the field of physical education reveal the need to incorporate technology and optimal learning environment in order to promote psychological well-being. In Perez et al (2022), the need to improve psychological well-being entails expanding the important role of the community in which parents, school and government are actively participating in order to contribute a positive environment for all. A crucial implication emerges concerning the proper training and preparation of both educators and learners in effectively harnessing educational technology. The onus lies on institutions and policymakers to bridge the gap in digital literacy and skill development. Additionally, addressing the persistent challenges associated with the adoption of these technologies in pedagogical practice becomes paramount, given the potential consequences on personal well-being. Furthermore, the application of bibliometric analysis in the current study unveils not only the thematic contours of the field but also its temporal evolution. Such analytical tools hold promises for guiding future research endeavours and identifying emerging avenues for exploration within the realm of well-being associated with educational technology.

CONCLUSION

The incorporation of educational technology across diverse educational landscapes has garnered significant prominence in recent decades. Concurrently, this integration has stimulated a confluence of personal well-being concerns, stemming from a variety of sources such as the nonstop demand to keep pace with technological evolution and the associated pressures entangled with their utilization. The focal objective of this review study resides in furnishing a panoramic elucidation of the scholarly literature underpinning this domain. The application of bibliometric analysis has, in turn, empowered us to meticulously dissect this research field. The findings of this study collectively contribute to the illumination of the field's trajectory and advances our holistic understanding of the field of educational technology in pedagogy.

In the course of examining the studies enveloping this domain, a noticeable pattern emerges—namely, the exponential proliferation of concerns surrounding learner and teacher well-being vis-à-vis the utilization of educational technology. This observation is contrasted with the identification of novel paths evident within both recent and slightly older studies. Consequently, the challenges intertwined with the integration of educational technology within the educational setting have undergone a transformative realignment, in agreement to the currents of present-day and emergent trends. This topic is of great interest to teachers and educational institutions amid the worldwide adoption of ICTs owing to the current fourth industrial revolution (4IR) agenda. In this context, future research on this phenomenon needs to be conducted with the use of qualitative and

mixed-method research methodologies, more specifically within less developed countries. Future research could also look at comparative analyses on how the use of educational technology during and post the pandemic has affected the well-being of learners and teachers.

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