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# E-LEARNING ATTITUDES AND TECHNOPHOBIA AMONG SCHOOL TEACHERS: A BIBLIOMETRIC ANALYSIS UTILISING SCOPUS DATABASE

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**Abstract**
Purpose: Technology is essential to improving education, affecting its application and effects on teaching and learning. Technophobia, or fear about technology-driven education, digital resistance across varied platforms, constrained involvement, lack of fast feedback, and practical activity issues affect teachers' E-learning attitudes. This study seeks to define publication trends and growth trajectories from origin to the present, identify notable publications, authors, and journals, and establish collaborative networks.
Methodology: A bibliometric analysis of 1109 Scopus database papers from 2000 to 2025 covering " E-Learning Attitude " AND " Technophobia OR fear" AND "teach*" was conducted across various fields. Performance analysis was employed to address research inquiries about renowned authors, document citations, journal annual publications, and top university contributions. VOSviewer was used for scientific mapping to address research queries on country bibliographic linkage and author keyword co-occurrence.
**Key findings:** The paper found five documents by most referenced author, Al-Maroof, R.S., and Alhumaid, K. In 2023, 202 documents and 3741 citations peaked. The top journal among 144 was 'Education and Information Technologies' with 36 documents. 'The University of Sharjah' released 11 articles on educational technology integration, e-learning policy, and teacher training. The US led in volume and impact, followed by the UK, China, Australia, and India. The top co-occurrence keywords were "human," "teaching," "e-learning," "education," "student," and "online learning," followed by others.
**Implications:** By providing a complete picture of current research, this study could influence e-learning attitude, educational policy, teacher training, and technological advancement. By mapping the conceptual and intellectual structure of this discipline, this analysis will help stakeholders identify areas for intervention and future research that will help instructors adapt to the digital transformation of education.

**Keywords:** e-learning attitude, online learning, school teachers, teachers' attitude, technophobia, bibliometric analysis

## 1. Introduction

The present technological development, which enhances web interactivity and media content while improving distribution platforms, fosters an optimal environment for the proliferation of e-learning tools and solutions. Technology has increasingly become integrated into education, yielding favourable effects on learning and teaching outcomes. The study by (Alkhattabi, 2017) identified elements influencing user acceptance of the AR application as an e-learning tool, including IT infrastructure and skills, resistance to change, and willingness. Technology integration in education can augment instruction by equipping educators with more pedagogical resources, enhancing student learning, and fostering active engagement in the classroom (X. Zhang et al., 2025). Technology is essential to improving education, which affects its application and effects on teaching and learning.

### 1.1 E-Learning Attitude among School Teachers

(Levidze, 2024) investigated that the COVID-19 epidemic sped up the digital revolution of education by a huge amount, driving schools all around the world to quickly switch to e-learning methods. This abrupt shift has exposed considerable variations in teacher readiness and technology receptiveness, especially among educators who frequently lack specialized training in digital pedagogy. E-learning satisfaction is defined as educators'

emotional response to the learning management system. The overall attitude of end-users towards the e-learning environment is a significant aspect (Albirini, 2006). Individuals with favourable views about technology exhibit greater comfort in its use and are thus better equipped to confront obstacles (Albirini, 2006). Attitude denotes the views and emotions an individual hold regarding a subject, a more favourable disposition towards the LMS, IOT, or Artificial Intelligence, characterized by a lack of apprehension towards its obstacles and complexities, correlates with greater satisfaction with the system (Piccoli, Ahmad & Ives, 2001). Hence, it became seemingly difficult to prepare pre-service teachers for education, e-learning driven by AI (Pedro et al., 2019). As a result, there is a strong need for studies on embracing AI in teacher education and figuring out what elements influence its use (C. Zhang et al., 2023).

### 1.2 Computer Anxiety and Technophobia

Certain issues like computer anxiety, lack of specialized training in digital pedagogy instructional approaches on online platforms, and language fear affect teachers' E-learning attitudes. The term 'Technophobia', or fear about technology-driven education, digital resistance across varied platforms, constrained involvement, lack of fast feedback, and practical activity has arisen recently. Research on technophobia has progressed from first investigations into computer anxiety to modern studies focusing on digital resistance across diverse technological platforms. Weil and Rosen's ground-breaking research on technophobia established the groundwork for comprehending psychological reactions to technology, encompassing anxiety, dread, and resistance (Weil & Rosen, 1995).

Fear of technology, anxiety, and apprehensions regarding technological failures can impede its adoption. Anxieties regarding possible failures or issues related to privacy can markedly diminish teachers' readiness to embrace these (Shen et al., 2025).

Anxiety or phobia of computers is characterized as a significant and prevalent psychological condition (Igbaria & Parasuraman, 1989). Computer-related anxiety continues to be a significant concern due to the rise in online courses in recent years (Saade & Kira, 2007).

According to (C. Zhang et al., 2023) the apprehension surrounding AI is a legitimate issue in the creation and implementation of AI products. Pre-service educators might focus on alternative considerations owing to their restricted familiarity and understanding of AI technology. Consequently, it is imperative that teacher education programs offer ample exposure and training to pre-service teachers regarding the utilization and prospective advantages of AI-driven educational tools. This can facilitate a more profound comprehension of the technology, empowering individuals to make well-informed choices regarding its implementation and utilization within the educational environment. In environments where educators emphasize the importance of teaching quality and student outcomes, such apprehension may impede their willingness to embrace and sustain the utilization of AI tools. A pronounced inverse correlation can be observed between anxiety regarding artificial intelligence and the level of trust in it. Suspicion towards AI tools intensified apprehension, particularly in instances of technical malfunctions or when these tools do not fulfil anticipated standards. Educators might question the dependability of AI instruments or harbour concerns regarding potential uncontrollable hazards (Shen et al., 2025).

### 1.3 Trust, Confidence, and Perceived Risk

The intention to utilize AI is generally bolstered by satisfaction and trust, (Shen et al., 2025) identified that the contentment of educators plays a significant role in determining the adoption of AI technology. Psychological elements, including the sense of

psychological safety, confidence in AI technology, and apprehension regarding technological malfunctions, significantly influence ongoing utilization. Although educators may perceive AI tools as user-friendly and beneficial in alleviating their responsibilities, a significant sense of risk can jeopardize this dynamic. Apprehensions regarding the stability of tools or potential privacy concerns may heighten anxiety, thereby diminishing confidence in the usability of the tool and ultimately influencing the intention to continue its use (Ali et al., 2021). Furthermore, the perceived risk serves as a moderating factor in the relationship between performance expectancy—specifically, educators' anticipations regarding AI's potential to enhance teaching efficacy and student results—and the intention to continue its use. Although educators may hold the view that AI tools can improve educational results, significant concerns regarding potential technical failures or privacy violations can undermine trust and diminish their willingness to persist in utilizing the technology (Nazaretsky et al., 2022). The concept of perceived risk includes not merely the potential for technical malfunctions but also apprehensions regarding data privacy and security, particularly in contexts where student information is at stake. The confidence that educators place in technology is of paramount importance, as an increased perception of risk frequently results in diminished acceptance and intention to continue its use (Aljumaiah et al., 2025).

Blended learning (BL), as mentioned by (Dahri et al., 2024), is a pedagogical approach that integrates online and in-person instruction, and is praised for its capacity to enhance educational results and address the difficulties inherent in traditional teaching methodologies.

As investigated in their study (Moses, Khambari, & Wong, 2008), revealed that proficient troubleshooting skills are essential for ICT to function as a dependable tool. Technological assistance significantly influences educators' utilization of technology, enhancing technology usage and consequently increasing the probability of ICT integration in teaching and learning processes. Researchers indicated that the government should strive to finance technology adoption initiatives that consider sector-specific needs and exhibit flexibility regarding content, scheduling, and implementation methods (Joseph & Muley, 2024).

### 1.4 Self-Efficacy and Competence in Teaching

(Bandura, 1977) posits that self-efficacy denotes an individual's conviction on their capacity to execute specific tasks effectively. Student teachers who exhibit a strong belief in their capability to utilize AI technology often demonstrate an enhanced sense of assurance and proficiency, which in turn diminishes their perception of the obstacles associated with this technology. In the interim, student teachers who regard AI-driven educational tools as engaging are likely to exhibit heightened motivation to explore and utilize these resources, thereby enhancing their propensity for adoption and their assessment of usability (C. Zhang et al., 2023). Pre-service educators in teacher education programs are likely shaped by the perspectives of their peers, mentors, and supervisors. When pre-service teachers recognize that their social referents maintain favourable views regarding AI, they are more inclined to assimilate these perspectives and exhibit analogous behaviours. This phenomenon can be elucidated through the lens of social cognitive theory (Bandura, 2002), which posits that individuals' interpretations of social influence may significantly affect their self-efficacy, perceived expectations, and propensity for resistance to change. Therefore, comprehending the influence of subjective norms on pre-service teachers' attitudes towards AI is essential for fostering the effective adoption and integration of AI within the educational sphere. Moreover, the

pertinence of the job plays a crucial role in influencing pre-service teachers' willingness to embrace and integrate AI (C. Zhang et al., 2023).

The study by (Kruskopf et al., 2024) revealed that two dimensions have been validated for the instruction of self-efficacy in ICT competencies. Youth, male gender, and a STEM background are associated with self-efficacy in practical and algorithmic competence in teaching. Females indicated a more robust positive correlation between prior education and algorithmic self-efficacy than males. ICT competencies exhibit gendered self-efficacy biases, in contrast to other 21st-century skills. Educators require additional resources to enhance their pupils' digital and algorithmic literacy skills.

This study seeks to define publication trends and growth trajectories from origin to the present, identify notable publications, authors, and journals, and establish collaborative networks using bibliometric analysis.

### 1.5 Research Questions:

The three core terms "E-Learning Attitude," "Technophobia OR fear," and "Teach*" are the subject of this study. The questions are as follows:

RQ1:Who are the most well-known writers in this field?
RQ2:What are the documents with the most citations?
RQ3: Which journal sources publish the most papers annually?
RQ 4: Which are the top universities publishing articles in this domain?
RQ 5: Which nations have the strongest bibliographic links?
RQ 6: Which key terms appear most frequently in the published articles?

## 2. Literature Review

(Alam et al., 2025) in their examination of educators in Saudi Arabia, delved into the intricacies of digital pedagogy and proficiency, focusing on instructors delivering English skill courses through digital platforms. This study explicitly addressed cultural, societal, interpersonal, and ethical considerations associated with the acquisition of knowledge through and alongside digital technologies, thereby underscoring the practical application of digital competencies.

The results suggest a necessity for ongoing professional development for educators regarding the various platforms employed in the instruction of the English language. Furthermore, the principal conclusions of the current investigation reveal the absence of prompt feedback, limited interaction, apprehension regarding technology-based teaching methods, and challenges associated with practice-oriented tasks.

A comprehensive review by (Granic, 2022) confirmed that the adoption of educational technology is mostly influenced by self-efficacy, subjective behavioural norms, enjoyment, facilitating conditions, computer anxiety, system accessibility, and technical complexity. However, attitudes and judgments of educators appear to be inconsistent and susceptible to alteration over time (X. Zhang et al., 2025).

Research by (C. Zhang et al., 2023) indicated that stereotypes can significantly contribute to the development of anxiety and self-doubt in female students. Moreover, it is this very stereotype that influences the self-efficacy of female pre-service teachers, leading them to perceive themselves as inadequately equipped to engage with AI in the educational sphere. The findings offer valuable perspectives for educators and technology developers, illuminating the potential obstacles that female pre-service teachers might encounter in the adoption and utilization of AI-based technologies. It underscores the necessity of addressing these challenges through focused interventions and support systems.

Research undertaken during the COVID-19 pandemic suggests that fear of the virus may have indirectly enhanced university students' involvement with online learning resources (Al-

Maroof et al., 2021); (Al-Maroof et al., 2023). Furthermore, research demonstrates that professional development programs are essential in facilitating educators' technology adoption behaviours, specifically in cultivating the requisite skills and competencies for effective integration, encompassing both pedagogical and technological proficiencies (Zhang, 2022a; Klimova et al., 2023); (X. Zhang et al., 2025). Nevertheless, constrained resources and time limitations sometimes hinder instructors from obtaining formal training, compelling them to acquire knowledge in informal environments (Zhang, 2022a); (X. Zhang et al., 2025).

The intention of higher education in-service instructors to use AI tools was investigated by (Wang et al., 2021). The TAM served as the foundation for their study, which used anxiety, self-efficacy, attitude toward AI, perceived usefulness, and ease of use to predict instructors' desire to employ AI tools. Based on the TAM, the study by (C. Zhang et al., 2023) validated the factors influencing German pre-service teachers' intention to utilize AI-based educational applications. Furthermore, because there are a lot of female pre-service teachers overall, the results show how important it is to address gender-specific issues in teacher education.

(Kirinić et al., 2023) determined the elements that could drive digital transformation in secondary educational institutions in Croatia. Within the theoretical framework of the technology acceptance model (TAM), the findings of the survey of 185 educators and the subsequent factor analysis indicated that the material support of institutions is required as a foundation for change. On the other hand, individual factors such as fear of technology and digital enthusiasm could be responsible for determining how teachers react to the acceptance of new technologies.

The findings Dahri indicated that both extrinsic and intrinsic motivational factors play a substantial role in shaping teachers' motivation to engage with blended learning training programs for teachers (Dahri et al., 2024).

A multiple case study was published with the purpose of bridging this gap and investigating the online formative assessment (FA) and feedback practices of three English as a Second Language (ESL) teachers who were employed at three institutions located in India, Bangladesh, and Nepal. The researchers acquired the data through classroom observations, interviews, and document analysis. Despite the fact that they did not make appropriate use of the information acquired from assessments and that there were still many areas in which they might improve, the findings indicated that all of the teachers actively engaged their pupils in a variety of FA practices. Students were able to access their feedback practices, which included the utilization of a few digital resources. These practices were consistent (Mahapatra, 2021).

(Aisha & Ratra, 2022) stated that in addition to posing certain difficulties that affected both teachers' and students' general psychological well-being, the effects of online teaching and learning during the COVID-19 pandemic presented many opportunities. It was discovered that both teachers' and students' interests and experiences were impacted by online learning, which also had a significant psychological impact. Therefore, with well-designed lessons, sufficient infrastructure or resources, and acceptable technological abilities, the psychological well-being of teachers and students should be taken care of for the successful implementation of online and blended learning.

(Uzun et al., 2023) investigated the correlation between educators' perceptions of distance education and their proficiency in digital literacy. The attitudes of educators regarding distance education and their levels of digital literacy were assessed through a survey methodology. The study involved 1,059 educators, including 557 males and 498 females. The researchers devised a personal information form as a means of data collection. The findings indicated that educators exhibited a moderate disposition towards distance education, coupled with a digital literacy level that surpassed the moderate threshold. The findings from the canonical correlation

analysis indicate a strong significance between educators' perspectives on distance education and their proficiency in digital literacy. In forthcoming research, it is imperative to implement measures that will foster educators' perspectives on remote learning while simultaneously elevating their awareness, understanding, and enthusiasm.
The researchers (He et al., 2024) reported challenges in online learning, including diminished motivation and satisfaction, insufficient focus on learning, and negative academic emotions in online English language instruction, have garnered heightened interest from educators and researchers. This study examines the dimensional aspects of perceived teacher emotional support in online learning environments and empirically investigates the effects of students' academic mood, learning efficacy, and academic engagement, along with the influencing factors of perceived teacher emotional support.
(Al-Maroof et al., 2021) in the survey included 768 college students during the outbreak. These pupils had taken online and face-to-face classes. A structural equation modeling (SEM) test was used to analyze the independent variables, which included users' situation awareness (SA), perceived ease of use, perceived usefulness, contentment, information retrieval (IR), education system quality, and information quality. An online questionnaire examined students' intentions to use online platforms in face-to-face learning. The results showed that (a) students prefer online platforms with a higher level of content richness to implement the three dimensions of users' situation awareness (perception, comprehension, and projection); (b) TAM constructs have significant effects on students' satisfaction and acceptance; and (c) students prefer a learning platform with high educational system and information quality (Al-Maroof et al., 2021).
A study by (Alkhattabi, 2017) included 200 primary school teachers in Saudi Arabia, comprising both men and women aged 25 to 55, and sought to evaluate the practicality of employing augmented reality applications in an e-learning context, focusing on instructors' willingness and user acceptance from their perspective. The study concludes that elementary school instructors have a desire to utilize and a high acceptance rate of augmented reality (AR). Furthermore, the findings suggested that the establishment of a suitable ICT infrastructure, along with the development of robust human resources and IT competencies, could serve as significant motivators when available.
For this study, the researchers chose bibliometric analysis, as it has become a potent methodological tool for delineating the conceptual framework of scientific disciplines, pinpointing nascent trends, and illustrating cooperation networks across research areas. Utilizing this methodology in e-learning research yielded significant insights into the progression of academic interest about teachers' technological adoption and resistance (Boateng et al., 2024).

## 3. Research Methodology

The goal of this study is to use the Scopus database to do a full bibliometric analysis of research that looks at school teachers' views toward e-learning and their fear of technology. It specifically aims to identify publication trends and growth patterns from inception to the present; map the geographical distribution of research production and collaboration networks analyse bibliographic linkages among various countries; identify the most influential publications, authors, and journals; and highlight emerging research frontiers and knowledge gaps in the field.

### 3.1 Bibliometric Analysis

A meticulously organized and precise approach to analyzing extensive scientific data, bibliometrics allows for the exploration of the intricacies of a specific field's development while shedding light on its emerging frontiers (Donthu et al., 2021). Given its key benefit of providing detailed scientific mapping over specific timeframes that uncovers new trends for use by practitioners or decision-makers across various fields, bibliometric analysis has gained traction and is being widely applied in all sectors. VOSviewer employs the acronym VOS, representing Visualizing Similarity, to generate the map. Performance indicators were calculated using Microsoft Excel, while science mapping was conducted with VOSviewer software.

### 3.2 Analysis of Bibliometric Data

As noted, (Donthu et al., 2021), there has been a notable increase in the use of bibliometric analysis in business research lately. This trend can be linked to the development of bibliometric software such as VOSviewer, Bibliometrix (an R package), CiteSpace, and Biblioshiny, as well as the availability of scientific databases like Scopus and Web of Science. Additionally, there has been a cross-disciplinary transfer of bibliometric methods from information science to the field of business research. Bibliometric analysis centers on comprehensive and impartial data, including citation counts, publication totals, and occurrences of keywords.

### 3.3 Search Strategy

A bibliometric analysis was conducted on studies published regarding " E-Learning Attitude " AND " Technophobia OR fear" AND Title-Abs-Key "teach*" (for teacher or teaching) utilized across various fields. The main data source utilized for the VOSviewer software (version 1.6.20) was Scopus. The preliminary investigation produced more than 1200 articles. The application of the "All fields" search criterion along with the time period filter resulted in a refined total of 1192 documents. The categorization of subjects contributed to a more precise refinement of the papers. A bibliometric analysis was conducted on 1109 documents covering the period from 2004 to 2025. The investigation was carried out on Sep 10, 2025.

### 3.4 Bibliometric Methods

As per (Donthu et al., 2021), bibliometric methods can be categorized into two primary types: performance analysis and science mapping. Performance analysis fundamentally considers the inputs from various components, while science mapping focuses more on the relationships between those components.

Below is a comprehensive overview of performance assessments and indicators related to science mapping:

**i)** The examination of **performance analysis** encompasses the quantity of publications by leading authors, contributions from major journal sources, most cited documents, and affiliations from prominent universities utilizing MS-Excel.

**ii)** The mapping of **scientific indicators** involves analysing bibliographic networks among countries and the co-occurrence of keywords using VOSviewer software.

### 3.5 Data Extraction

The Scopus database served as the source for information extraction. The procedure was systematic and comprised the subsequent stages. Initially, the team accessed the Scopus database and populated the keyword fields in the first row. The selection included "All fields" for the terms "E-Learning Attitude" and "Technophobia" or "fear," along with "teach*." Following the application of time and subject area filters, a total of 1109 study results remained available. The file has been downloaded in a tab-delimited format. The Scopus database was

utilized to calculate performance metrics. Analytical evaluations were performed utilizing VOSviewer software.

## 4. Results and Discussion

### i) Performance Analysis

### 1) Most Prolific Authors

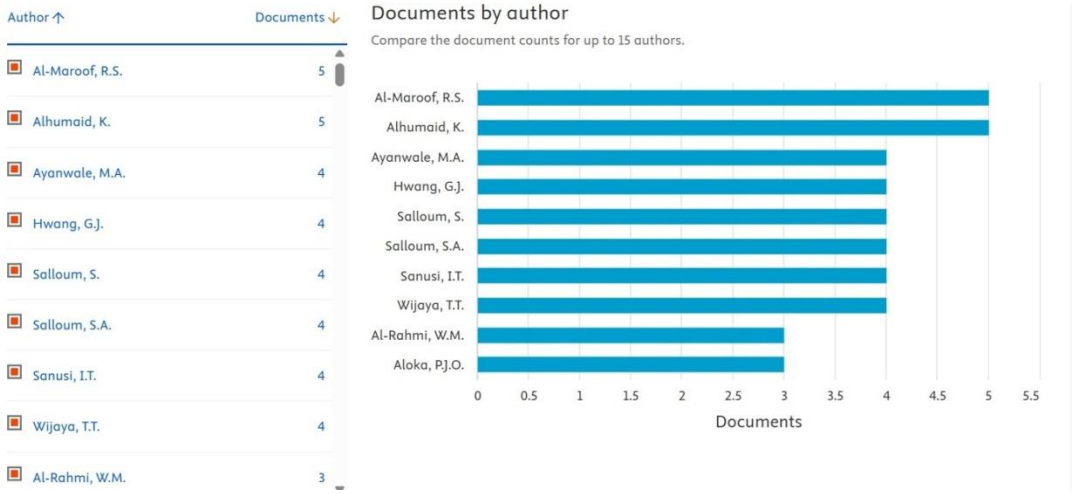


**Figure 1: Most Prolific Authors with number of Published Documents**
Source: Scopus database

Top authors out of 161 are illustrated in Figure 1.
Al-Maroof, R.S. (5 documents) has most cited papers, mentioned models of technology acceptance and the psychological elements that affect how teachers and students utilize e-learning and the effectiveness of online platforms after the pandemic.
Alhumaid, K. (5 documents) research focused on creating an educational framework for implementing mobile learning in the context of COVID-19. How digital change is changing education and the problems instructors have to deal with in the post-pandemic world. Ayanwale, M.A. (4 documents) looks into the factors that examine the perceptions of pre-service teachers regarding artificial intelligence through the lens of planned behaviour theory. Hwang, G.J. (4 papers) had important research in the field of educational technology with innovative approaches to enhance employees' knowledge and practical skills. The researcher collaborated on a blended learning approach that utilized SVVR for professional training.
Salloum, S. / Salloum, S.A. (4 papers combined) research centers on employing machine learning algorithms to forecast individuals' intentions to utilize mobile learning platforms amid the COVID-19 pandemic.
Sanusi, I.T. (4 documents) examined educators' preparedness and motivation to incorporate artificial intelligence into school curricula.
Wijaya, T.T. (4 papers) focused on digital math books and tools that let students learn by doing. Showed the pros and cons of using digital tools in STEM instruction.
Al-Rahmi, W.M. (3 papers) was noted for his work on how to use social media in schools and in places where people work together to learn.
Aloka, P.J.O. (3 papers) looked at psychological hurdles to e-learning, like anxiety and tension, especially in impoverished countries. Their research may also examine the mental health effects of digital transition.

**2) Document-wise Citations**

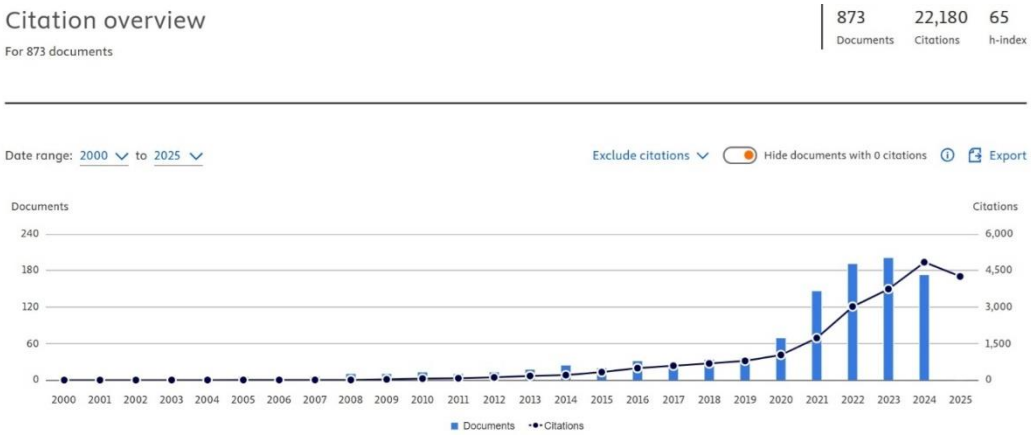


**Figure 2: Document-wise Citation overview**

Source: Scopus database

By means of a document with regard to the 873 documents that were obtained, a total of 22,180 citations and 65 h-indexes are presented below. In the year 2020, there was an increase in the number of papers seen, with 70 papers and 1031 citations. In the year 2021, there were 147 papers and 1727 citations. In the year 2022, there were 192 documents and 3020 citations. In the year 2023, there were the maximum number of documents: 202 documents and 3741 citations. There were 174 documents and 4842 citations in the year 2024, as displayed in Figure 2.

**3) Top Journal Sources**

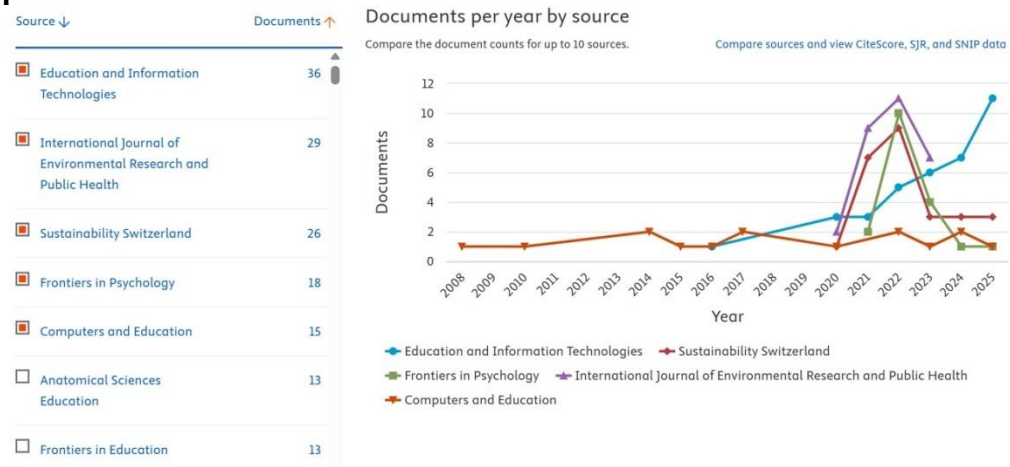


**Figure 3: Top Journal Sources with number of Documents**

Source: Scopus database

Figure 3 demonstrates top journals among 144. 'Education and Information Technologies' had the most documents, with 36 that addressed questions about digital technology in education, how ICT may be used in teaching, national regulations, and big projects. 'The International Journal of Environmental Research and Public Health' featured 29 articles on global health, environmental health, and mental and behavioural health. 'Sustainability Switzerland' has 26 articles which dealt on environmental, cultural, economic, and social sustainability. 'Frontiers in Psychology' published 18 papers on psychology, such as educational psychology and technophobia, followed by other sources.

**4) Top Affiliations**

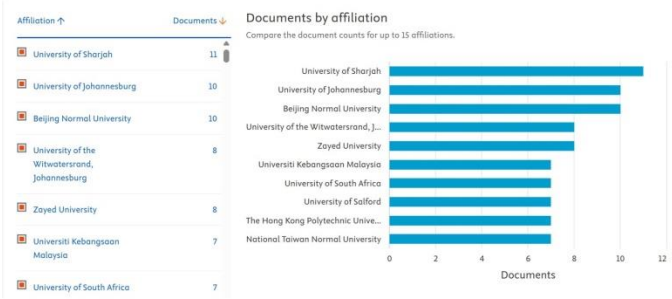


**Figure 4: Top Universities with number of Documents**

Source: Scopus database

In Figure 4, the top universities out of 160 affiliations are illustrated.

'The University of Sharjah' published 11 papers about technology integration in schools, e-learning policies, and training for teachers. The 10 articles on digital equity, socio-technical hurdles, and teacher professional development published at the 'University of Johannesburg, South Africa'. 'Beijing Normal University, China' published 10 papers on AI in education, technophobia psychology, and policy analysis. 'The University of the Witwatersrand in Johannesburg, South Africa' contained 8 papers on community-focused e-learning, decolonial techniques, and education in rural areas. 'Zayed University, of the United Arab Emirates' contributed eight papers about quality assurance, accreditation requirements, and curriculum development, followed by other universities.

**5) Top Nations with Strongest Bibliographic Network**

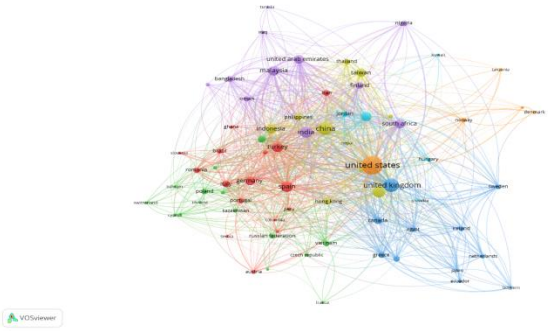


**Figure 5: Top Nations with Bibliographic Links**

Source: Scopus database

Of 106 countries, 74 met the criteria as displayed in Figure 5 with network visualisation. When applied to countries, bibliographic coupling shows how countries involved in research on related subjects relate to one another, identifies patterns of cooperation, and describes networks for sharing knowledge and discovering new research directions. "Coupling strength" refers to the degree of common reference between two nations. A stronger connection indicates a more noticeable theme similarity. Based on similar references, nations such as the United States, the United Kingdom, China, Australia, and India are grouped together and designated as cluster groupings of different colors.

| # | country | documents | citations | total link strength | # | country | documents | citations | total link strength |
|---|---|---|---|---|---|---|---|---|---|
| 1 | United States | 178 | 6353 | 2244 | 11 | Saudi Arabia | 43 | 788 | 1205 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | United Kingdom | 92 | 2054 | 1703 | 12 | Germany | 41 | 828 | 593 |
| 3 | China | 90 | 935 | 1592 | 13 | United Arab Emirates | 39 | 1256 | 1017 |
| 4 | Australia | 66 | 1022 | 1152 | 14 | Taiwan | 35 | 1167 | 579 |
| 5 | India | 64 | 1199 | 1312 | 15 | Canada | 26 | 608 | 495 |
| 6 | Spain | 58 | 899 | 1057 | 16 | Pakistan | 25 | 436 | 561 |
| 7 | Turkey | 48 | 499 | 850 | 17 | Italy | 24 | 343 | 342 |
| 8 | Malaysia | 47 | 719 | 1022 | 18 | Finland | 23 | 622 | 531 |
| 9 | Indonesia | 45 | 357 | 690 | 19 | Iran | 19 | 185 | 313 |
| 10 | South Africa | 44 | 673 | 1117 | 20 | Bangladesh | 18 | 210 | 473 |

**Table 1: Top Nations with Documents Citations and Total Link Strength (TLS)**
Source: Scopus database

As illustrated in Table 1, it is evident that the United States (178 documents, 6353 citations, 2244 TLS) is the dominant leader in terms of both volume and impact. It has published almost twice as many papers as the UK, which is in second place, and its work has been cited more than three times as often. The UK (92, 2054, 1703) is the influential collaborator with a clear impact and strong productivity. China (90, 935, 1592), the highly productive contributor, is almost tied with the UK in terms of output, which shows that a lot of research has been done in this field. Australia (66, 1022, 1152) performs robustly, with a strong economy and a good level of influence for a country of its size. India (64, 1199, 1312), the emerging powerhouse, has a lot of research output that is important on the world stage. Citations (1199) show that certain highly cited papers from India are having a big effect or that its research in this area is especially important and influential.

### 6) Most Occurring Keywords

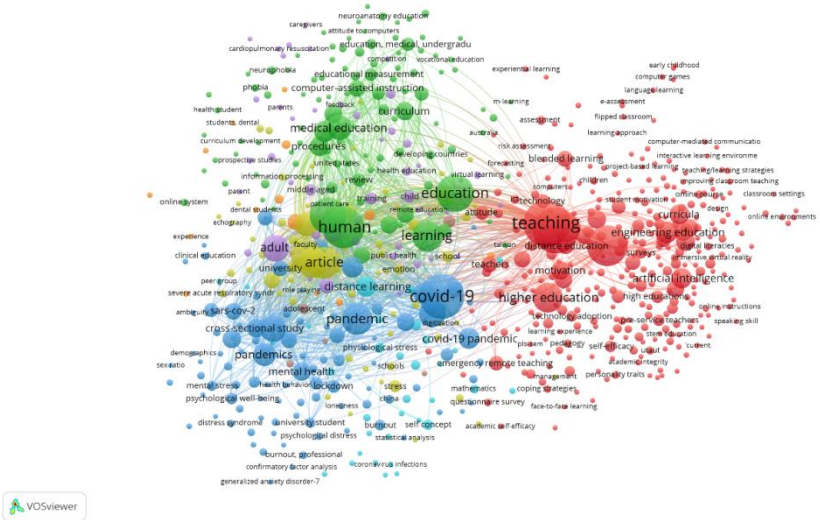


**Figure 5: Top keywords with most occurrences**
Source: Scopus database

Out of 4773 keywords, 690 achieved the threshold as illustrated in Figure 5. The center of the figure is the largest and encircled big key terms with all the other keywords. The co-occurrence of author keywords "teaching," "e-learning," "education," "student," and "online learning" were among the top key terms displayed through network visualization.

| # | keyword | occurrences | total link strength | # | keyword | occurrences | total link strength |
|---|---|---|---|---|---|---|---|
| 1 | teaching | 229 | 3086 | 11 | male | 97 | 2448 |
| 2 | e-learning | 217 | 2685 | 12 | learning | 96 | 1631 |
| 3 | covid-19 | 215 | 2591 | 13 | higher education | 93 | 640 |
| 4 | human | 177 | 3820 | 14 | online learning | 81 | 608 |
| 5 | students | 174 | 1895 | 15 | student | 75 | 1420 |
| 6 | education | 148 | 2447 | 16 | adult | 74 | 1928 |
| 7 | humans | 137 | 3083 | 17 | coronavirus disease 2019 | 71 | 1920 |
| 8 | article | 107 | 2649 | 18 | medical education | 64 | 1205 |
| 9 | pandemic | 100 | 2043 | 19 | questionnaire | 62 | 1543 |
| 10 | female | 98 | 2455 | 20 | pandemics | 54 | 1501 |

**Table 2: Popular Keywords with Occurrences and Total Link Strength (TLS)**

Source: Scopus database

As demonstrated in Table 2, the keyword ‘human’ (TLS: 3820, Occurrences: 177), has the greatest by far, which means that almost all of the research in this dataset is based on real-world data and includes people (teachers, pupils). It serves as a universal link since all research in this social science/education domain pertains to humans.

‘teaching’ (Occurrences: 229, TLS: 3086) is the main thing being looked at. The emphasis is not on technology in isolation but on its utilization in the teaching process. Having the most occurrences (229) is important since it indicates that the research is mainly about pedagogy and teaching methods. The strong link reveals that it is often researched with words like "online learning," "teacher attitudes," and "educational methods."

‘e-learning’ (Occurrences: 217, TLS: 2685) is the main thing or way of delivering that is being looked at. It's the general word that covers the whole field. Its strong link strength demonstrates that it is related to several subtopics, including specific tools, teaching methods, and results.

The main event or reason that made the field famous is ‘COVID-19’ (Occurrences: 215, TLS: 2591). It is really intriguing because covid-19 has a very high occurrence count, almost as high as e-learning itself. A large part of the current literature talks about the pandemic as the main reason for the quick, forced switch to e-learning. It has a strong connection strength, which means that it has been researched in relation to stress, adaptation, emergency remote instruction, and teacher anxiety.

‘students’ (Occurrences: 174, TLS: 1895) refers to the people who are taught. This topic of study isn't only about instructors; it's also about how teachers and students interact in a digital setting. Its presence confirms that the effect on learners is a crucial factor. Studies probably look at how instructor technophobia or attitudes affect how engaged, successful, and happy students are.

'education' (Occurrences: 148, TLS: 2447) is the general field or area where the research is happening. It serves as a general connection. Its high link strength (which is higher than its occurrence count would suggest) implies that when it does show up, it usually does so with a lot of other keywords, which keeps the research firmly in the educational environment, and so on.

## 5. CONCLUSION

The bibliometric analysis reveals the findings of the research questions. The prolific authors illustrated in Figure 1 comprehensively examined essential facets of e-learning attitudes and technophobia, encompassing psychological impediments to institutional approaches. Their work offered significant insights for policymakers, teacher trainers, and technology developers aiming to assist educators in the digital era. Figure 2 presented the documents that have received the highest number of citations. Figure 3 illustrated the journal sources that produce the highest number of publications each year. These leading publications indicate a vigorous and interdisciplinary domain for research concerning e-learning attitudes and technophobia among educators. Figure 4 demonstrated the leading universities that are contributing articles in this field. The large number of articles in technology and psychology publications shows how important both technological and psychological points of view are in dealing with digital resistance. The data in Figure 5 and Table 1 displayed that developed countries like the U.S., UK, and Australia dominate the research area. China has a lot of producing capability, and India is becoming a very important player. In Figure 6, Table 2, the focus of the research was on people, not technology. The prevalence of keywords such as "human," "teaching," and "students," together with their significant link strengths, culminated in a vital conclusion. This domain primarily addressed the human experience, psychological effects, and educational interactions inside digital learning settings. The emphasis was on the relationship between the technology and teachers and students, with a focus on themes like anxiety, self-efficacy, acceptance, and adapting to new ways of teaching. It is unequivocally clear that research on e-learning attitudes and technophobia among school instructors is predominantly influenced by the COVID-19 epidemic, which served as a global catalyst revealing significant digital inequities and psychological barriers to learning. The findings underscore that technophobia is not solely a personal reluctance, but rather a complex issue intricately associated with inadequate institutional support, training, and resources. This situation calls for comprehensive, fair interventions and cross-cultural studies to enhance teacher resilience and ensure the future efficacy of digital education.

## LIMITATIONS

The analysis was limited to articles that were indexed in the Scopus database only; consequently, it's possible that publications from unidentified databases like Web of Science, PubMed, Dimensions etc. were undetected.

## IMPLICATIONS

This study is important because it could help shape educational policy, teacher training programs, and technological progress by giving a complete picture of the present level of research. This analysis will assist stakeholders in finding important areas for intervention and research initiatives to better support teachers in the digital revolution of education by mapping the conceptual and intellectual structure of this field. Future study should seek to improve cross-cultural collaboration and tackle regional inequities in the implementation of e-learning.

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**References**

1. Aisha, N., & Ratra, A. (2022). Online education amid COVID-19 pandemic and its opportunities, challenges and psychological impacts among students and teachers: a systematic review. In Asian Association of Open Universities Journal (Vol. 17, Issue 3, pp. 242–260). Emerald Publishing. https://doi.org/10.1108/AAOUJ-03-2022-0028
2. Alam, S., Hameed, A., Balogh, Z., & Haque, S. A. (2025). DIGITALISATION OF EDUCATION: CHALLENGES AND ISSUES IN VIRTUAL PEDAGOGICAL COMPETENCE. Journal of Education, Culture & Society, 16(1).
3. Albirini, A. (2006). Teachers' attitudes toward information and communication technologies: The case of Syrian EFL teachers. Computers & Education, 47(4), 373-398.
4. Ali, M., Raza, S. A., Khamis, B., Puah, C. H. & Amin, H. How perceived risk, benefit and trust determine user Fintech adoption: a new dimension for Islamic finance. Foresight. 23(4), 403–420 (2021).
5. Aljumaiah, O., Jiang, W., Addula, S. R. & Almaiah, M. A. Analyzing cybersecurity risks and threats in IT infrastructure based on NIST framework. J. Cyber Secur. Risk Auditing. 2025(2), 12–26 (2025).
6. Alkhattabi, M. (2017). Augmented reality as e-learning tool in primary schools' education: Barriers to teachers' adoption. International Journal of Emerging Technologies in Learning, 12(2), 91–100. https://doi.org/10.3991/ijet.v12i02.6158
7. Al-Maroof, R. S., Alnazzawi, N., Akour, I. A., Ayoubi, K., Alhumaid, K., Alahbabi, N. M., Alnnaimi, M., Thabit, S., Alfaisal, R., Aburayya, A., & Salloum, S. (2021). The effectiveness of online platforms after the pandemic: Will face-to-face classes affect students' perception of their behavioural intention (BIU) to use online platforms? Informatics, 8(4). https://doi.org/10.3390/informatics8040083
8. Al-Maroof RS, Salloum SA, Hassanien AE, Shaalan K (2023) Fear from COVID-19 and technology adoption: the impact of Google Meet during Coronavirus pandemic. Interact Learn Environ 31(3):1293–1308. https://doi.org/10.1080/ 10494820.2020.1830121
9. Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. Psychological Review, 84(2), 191
10. Bandura, A. (2002). Social cognitive theory in cultural context. Applied Psychology, 51(2), 269–290. https:// doi. org/ 10. 1111/ 1464 0597. 00092
11. Boateng, S. L., Penu, O. K. A., Boateng, R., Budu, J., Marfo, J. S., & Asamoah, P. (2024). Educational technologies and elementary level education – A bibliometric review of scopus indexed journal articles. In Heliyon (Vol. 10, Issue 7). Elsevier Ltd. https://doi.org/10.1016/j.heliyon.2024.e28101
12. Dahri, N. A., Yahaya, N., Al-Rahmi, W. M., Noman, H. A., Alblehai, F., Kamin, Y. Bin, Soomro, R. B., Shutaleva, A., & Al-Adwan, A. S. (2024). Investigating the motivating factors that influence the adoption of blended learning for teachers' professional development. Heliyon, 10(15). https://doi.org/10.1016/j.heliyon.2024.e34900
13. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070
14. Granic A (2022) Educational technology adoption: a systematic review. Educ Inf Technol 27(7):9725–9744. https://doi.org/10.1007/s10639-022-10951-7
15. He, L., Feng, L., & Ding, J. (2024). The Relationship between Perceived Teacher Emotional Support, Online Academic Burnout, Academic Self-Efficacy, and Online

English Academic Engagement of Chinese EFL Learners. Sustainability (Switzerland) , 16(13). https://doi.org/10.3390/su16135542
16. Igbaria, M., & Parasuraman, S. (1989). A path analytic study of individual characteristics, computer anxiety and attitudes toward microcomputers. Journal of Management, 15(3), 373-388.
17. Joseph, A., & Muley, A. (2024). Technology Adoption and Upskilling to Manage Employee Attrition in It Companies: A Correspondence Analysis. International Journal of Economics, Business, Accounting, Agriculture and Management Towards Paradigm Shift in Research, 1(1), 1–9. https://doi.org/10.5281/zenodo.14230884
18. Kirinić, V., Čerepinko, D., & Rosanda Žigo, I. (2023). Factor Analysis of Croatian Secondary School Teachers' Readiness for Digital Transformation. Social Sciences, 12(12). https://doi.org/10.3390/socsci12120650
19. Kruskopf, M., Abdulhamed, R., Ranta, M., Lammassaari, H., & Lonka, K. (2024). Future teachers' self-efficacy in teaching practical and algorithmic ICT competencies – Does background matter? Teaching and Teacher Education, 144. https://doi.org/10.1016/j.tate.2024.104574
20. Levidze, M. (2024). Mapping the research landscape: A bibliometric analysis of e-learning during the COVID-19 pandemic. Heliyon, 10(13). https://doi.org/10.1016/j.heliyon.2024.e33875
21. Mahapatra, S.K. Online Formative Assessment and Feedback Practices of ESL Teachers in India, Bangladesh and Nepal: A Multiple Case Study. Asia-Pacific Edu Res 30, 519–530 (2021). https://doi.org/10.1007/s40299-021-00603-8
22. Michelle M. Weil, Larry D. Rosen, The psychological impact of technology from a global perspective: A study of technological sophistication and technophobia in university sudents from twenty-three countries, Computers in Human Behavior, Volume 11, Issue 1, 1995, Pages 95-133, ISSN 0747-5632, https://doi.org/10.1016/0747-5632(94)00026-E. (https://www.sciencedirect.com/science/article/pii/074756329400026E)
23. Milla Kruskopf, Rekar Abdulhamed, Mette Ranta, Heidi Lammassaari, Kirsti Lonka, Future teachers' self-efficacy in teaching practical and algorithmic ICT competencies – Does background matter?, Teaching and Teacher Education, Volume 144, 2024, 104574, ISSN 0742-051X, https://doi.org/10.1016/j.tate.2024.104574. (https://www.sciencedirect.com/science/article/pii/S0742051X24001069)
24. Moses, P., Khambari, M., Nida, M., & Wong, S. L. (2008). Laptop use and its antecedents among educators: A review of the literature. European Journal of Social Sciences, 7(1), 104-114.
25. Nazaretsky, T., Ariely, M., Cukurova, M. & Alexandron, G. Teachers' trust in AI-powered educational technology and a professional development program to improve it. Br. J. Edu. Technol. 53 (4), 914–931 (2022).
26. Pedró, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development. Paris: UNESCO. Retrieved June 8, 2022 from https:// unesd oc. unesco. org/ ark:/ 48223/ pf000 03669 94? locale= es
27. Piccoli, G., Ahmad, R., & Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training. MIS Quarterly, 401-426.
28. Saadé, R. G., & Kira, D. (2007). Mediating the impact of technology usage on perceived ease of use by anxiety. Computers & Education, 49(4), 1189-1204.

29. Shen, L., Qiu, N., & Wang, Z. (2025). Psychological safety and trust as drivers of teachers' continued use of AI tools in classrooms. Scientific Reports, 15(1). https://doi.org/10.1038/s41598-025-13789-4
30. Uzun, S., Meydan, A., Devrilmez, E., & Uzun, A. (2023). The relationship between teachers' attitudes towards distance education and their digital literacy levels. Journal of Pedagogical Research, 7(5), 111-121. https://doi.org/10.33902/JPR.202322499
31. Wang, Y., Liu, C., Tu, Y.-F. (2021). Factors affecting the adoption of ai-based applications in higher education: An analysis of teachers' perspectives using structural equation modeling. Educational Technology & Society, 24 (3), 116–129. Retrieved June 8, 2023 from https://www.jstor.org/stable/27032860
32. Zhang, C., Schießl, J., Plößl, L., Hofmann, F., & Gläser-Zikuda, M. (2023). Acceptance of artificial intelligence among pre-service teachers: a multigroup analysis. International Journal of Educational Technology in Higher Education, 20(1). https://doi.org/10.1186/s41239-023-00420-7
33. Zhang, X., King, A., & Prior, H. (2025). Attitudes before actions: how music teachers' technological acceptance and competence shape technological behaviour in China. Humanities and Social Sciences Communications, 12(1). https://doi.org/10.1057/s41599-025-05582-5
34. Zhi, R., Wang, Y. & Wang, Y. The Role of Emotional Intelligence and Self-efficacy in EFL Teachers' Technology Adoption. Asia-Pacific Edu Res 33, 845–856 (2024). https://doi.org/10.1007/s40299-023-00782-6