



Original Article

Investigating Technology Perceptions Among Secondary School Teachers: A Systematic Literature Review on Perceived Usefulness and Ease of Use

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Abstract

The study aims to review the literature of various research studies based on the perceived ease of use and usefulness of technology among secondary school teachers. This systematic literature review examines secondary school teachers' perceptions regarding the perceived usefulness (PU) and perceived ease of use (PEoU) of technology in educational contexts. The systematic review comprised 30 peer-reviewed research papers from 2015 to 2023, encompassing teacher participants. The results of the review highlight a range of vital significant perspectives. The integration of technology by teachers is significantly affected by elements such as aligning with the Technology Acceptance Model (TAM) and its customized versions, perceived usefulness, and ease of use. Necessary components to enhance teachers' technology adoption rates encompass support and training. The review further emphasizes the significant influence of perceived ease of use and perceived usefulness on ICT adoption, overshadowing the impact of demographic variables. The review process involved stringent eligibility criteria, ensuring that selected studies met specific quality standards and relevance to the research questions. As technology integration in education continues to evolve, this systematic literature review offers valuable insights for educators, developers, and policymakers.

Keywords: Perceived ease of use, Perceived usefulness, Secondary school teachers, Technology acceptance model, Technology adoption

INTRODUCTION

Since the creation of contemporary computing, information, and communication technologies unlocked the door to a universe of limitless possibilities, the rapid speed of technological advancement has been particularly dramatic. In 1910, renowned urban planner Daniel Burham observed that this rapid change was responsible for “the geometric widening of the sphere of knowledge, which every year is taking in a larger percentage of people as time goes on ... our pace of development having immensely accelerated” (Leoste, 2021, p. 9). Mugo et al., (2017) stated that governments are now updating national curricula in several nations worldwide to incorporate more information and communication technologies into them. Policy, teacher development, and technology adoption are the areas where the investment is focused. Technology adoption, training, and policy programs are geared toward fostering technology acceptance. Technology integration efforts in the education sector have long been a focus of educationists. According to published accounts, the electronic industry has consistently pressured the educational system to embrace technology for teaching and learning and other services provided by the school system. Predicting technology's acceptance and eventual usage, particularly for academic purposes, is a significant problem for its integration into education.

Mugo et al., (2017) further stated that it can be challenging to be successful in programs that aim to integrate technology into education. So before deploying any technology anywhere, including the classroom, innovators, and designers of electronic products (like IBM and Xerox) have frequently preferred to gauge user views. These metrics help educate the industry to create and market goods that consider consumer reactions, tastes, and preferences. However, analyzing user perceptions is essential for understanding how users interpret and respond to the various features of digital technology. The scholarly emphasis on effective technology integration within the educational context has driven the increased popularity of technology acceptance research in academic settings (Scherer et al., 2019).

A model was developed by Davis (1985), Davis et al., (1989) and draws on concepts from Rogers and Cartano, (1962), Takemura's (2021) behavioral decision theory, and Pajares' (1996) self-efficacy theory. The TAM authors presented two prominent variables:

- Perceived Usefulness: It denotes an individual's perception of how utilizing a particular system would enhance their efficiency in task completion.
- Perceived Ease of Use refers to an individual's perception of the ease of operating a specific technology.

Problem Statement

The problem statement in “Exploring Perceived Usefulness and Ease of Use of Technology among

Secondary School Teachers: A Systematic Literature Review” could address the challenges faced by secondary school teachers in integrating technology effectively into their teaching practices. It may also examine the factors influencing teachers’ perceptions of technology’s usefulness and ease of use, such as limited access to resources, inadequate training, or resistance to change. Additionally, the review might investigate how these perceptions impact teachers’ willingness to adopt and utilize technology in their classrooms, ultimately affecting student learning outcomes.

Aim of the Study

This study aims to systematically review existing literature to identify critical factors that influence secondary school teachers’ perceptions of technology’s ease of use and usefulness in classroom settings. It seeks to understand the methodologies employed in past research to explore these perceptions and examine significant trends and findings related to teachers’ attitudes toward educational technology across various global contexts. Additionally, the study intends to track the evolution of these insights over time, providing a comprehensive overview of teachers’ evolving views on integrating technology into education.

Research Questions

The study’s goal is to review the literature of various research studies based on the perceived ease of use and usefulness of technology among secondary school teachers. The subsequent research questions were constructed to review the relevant literature:

- What factors in current literature influence secondary school teachers’ opinions of technology’s ease of use and usefulness in the classroom?
- How have previous research methodologies contributed to our understanding of secondary school teachers’ viewpoints concerning technology’s ease of use and usefulness in education?
- What are the primary findings and trends in secondary school teachers’ insights into technology in different global educational contexts, and how have these evolved?
- What factors do current studies identify contributing to secondary school teachers’ perceptions of technology’s ease of use in classroom environments, and how do these factors affect technology adoption?

LITERATURE REVIEW

These two are proposed as the key variables determining whether users will accept using a particular system. According to the authors, people favor functionality over convenience. Hence, perceived usefulness is given more weight than perceived ease of use. TAM constructs like innovation adoption and user involvement can be utilized as markers of innovation sustainability, as claimed by Gbongli and Amedjonekou (2019). A research study defined TAM as simplifying the relationship between attitudes, knowledge, and desire to act and regards behavior to an end rather than a way to more fundamental goals. Additionally, TAM contradicts the limitations of the natural world by granting individuals unrestricted freedom to act once they express their intention to do so. The geographical context of school instructors using technology shows a varied landscape driven by numerous causes in various regions.

Global North’s Teachers’ Perspective of Technology Adoption

The improvement of digital skills worldwide has received more focus in recent years to enable everyone to take advantage of various e-opportunities. The objective among teachers is to enhance both their proficiency and interest in incorporating technology in instructional settings (Luik & Taimalu, 2021). Technology must be used in the framework of teacher professional development to interest and inspire teachers and students, increase their comprehension, and enhance their technological skills. Using technology increases educational flexibility by, for instance, allowing for accounting for various intellect and interest types (Hol & Aydin, 2020). This topic has become more prominent because of the COVID-19 pandemic, which broke out in the spring of 2020. Due to recent school closings and the requirement for teachers to instruct students remotely, teachers can no longer decide whether to employ technology in the classroom. This new circumstance is simple and inevitable. As a result, greater focus is being placed

on researching the intention to utilize technology, or more specifically, the level to which a teacher is ready to use it or would like to use it in the future (Joo et al., 2018).

Global South's Teachers' Perspective of Technology Adoption

Conversely, the adoption of technology presents distinct challenges for the developing nations. Common roadblocks to school instructors using technology include limited access, poor infrastructure, and resource shortages. Teachers in these areas frequently lack the technical expertise and training, making it challenging to incorporate technology into their teaching methods successfully. Socioeconomic differences and cultural aspects can also affect technology adoption, with specific regions and communities having more challenging issues than others. Over the last twenty years, the educational sector has experienced widespread evidence of Information and Communication Technologies (ICT) due to their extensive growth. The aspiration for new technological tools to enhance students' preparedness for the digital era, revamping a traditional educational system, and expediting national development have often been the rationale for the worldwide implementation of ICT in education. The promises mentioned above, particularly in developing nations, have sparked various irrational theories about the need for educational changes that will consider these new technologies. Most developing nations' governments have responded to the issue by launching national initiatives to integrate computers into education (Katemba, 2020).

Technology Adoption Concerning Perceived Ease of Use and Perceived Usefulness at School Level

A significant interest in educational technology integration relates to secondary school teachers' perspectives on technology's perceived ease of use and usefulness. The importance of integrating digital tools into the teaching and learning process has grown as it develops at a rapid rate. Knowing the factors that impact teachers' opinions of technology's ease of use and usefulness is vital for its acceptance and deployment. A systematic literature review in this area is essential for comprehending the existing body of knowledge, recognizing research gaps, and guiding future research. Technology integration in educational settings must have been deeply established in content-level learning processes, even before the 2020 pandemic (Harris et al., 2009).

Technology Adoption Concerning Perceived Usefulness at the School Level

According to Davis et al., (1989), perceived usefulness is generally described as the users' perception of how much a specific technology or digital tool will enrich their performance. Studies in the educational environments have supported the relevance of the perceived usefulness. According to Watson (2006), successful implementation of technology in the classroom depends on knowing how teachers view innovation. In the educational context, technology adoption signifies integrating digital tools and assets into the learning ecosystem. The degree to which teachers and administrators view technology as advantageous and helpful for teaching and learning is perceived usefulness, a crucial component in technology adoption. Assessing how educators view the value of technology in enriching teaching practices, encouraging student engagement, facilitating personalized learning, and improving educational results becomes crucial when considering technology adoption at the school level.

METHODOLOGY

The methodology for this research involves a systematic approach guided by the research onion framework (Saunders & Townsend, 2016). A qualitative research approach is adopted to understand human experiences deeply, employing methods like observation, interviews, and focus groups. Data collection methods involve an in-depth literature search, study selection based on predefined inclusion criteria, quality assessment, syntheses of results, data extraction, and full-text screening. Inclusion criteria specify the scope of studies, limiting them to a specific language and time frame. Exclusion criteria exclude studies published more than ten years ago or in languages other than the specified one. Search terms and a search strategy are employed, and data handling involves maintaining a database of references. Data analysis is conducted qualitatively through systematic reviews. Ethical considerations involve awareness of search bias, but formal ethical committee clearance is usually not required for systematic reviews. In this review, the inclusion of necessary studies research studies to be published

in peer-reviewed scholarly journals (excluding newspapers, magazines, and trade journals) within the timeframe of 2015 to 2023.

Additionally, adequate studies had to be published in English, have an empirical nature, and involve teacher participants (excluding monographs and editorials). The investigation also required completing at least one of the systematic review questions. A compilation of thirty articles meeting the desired criteria was identified after screening. These articles were published between 2015 and 2023, featured in scholarly databases, included teachers as participants, and presented empirical data (meta-analyses, mixed methods, quantitative and qualitative) relevant to the research questions and study's emphasis. The search encompassed electronic databases centered on social science and the domain of educational sciences. The search used Scopus, Taylor & Francis, Google Scholar, etc., to locate all relevant studies. With broader search parameters, the databases displayed approximately 977,000 results sorted by applicability and relevance. The most recent exploration occurred on October 17, 2023. The exploration strategy involves systematically selecting keywords, searching terms, recognizing specific phrases, and deploying topic headers to acquire a wide range of relevant research materials. The study encompasses a systematic review and separate individual research concentrating on the Perceived Ease of Use and Perceived Usefulness of Technology. The review is confined to studies published exclusively in the English language and studies conducted within a specific period, specifically the last ten years.

Screening Criteria

The visual representation in Figure 1 represents the screening process. Study inclusion relied on a sequential assessment of research abstracts against predefined criteria.

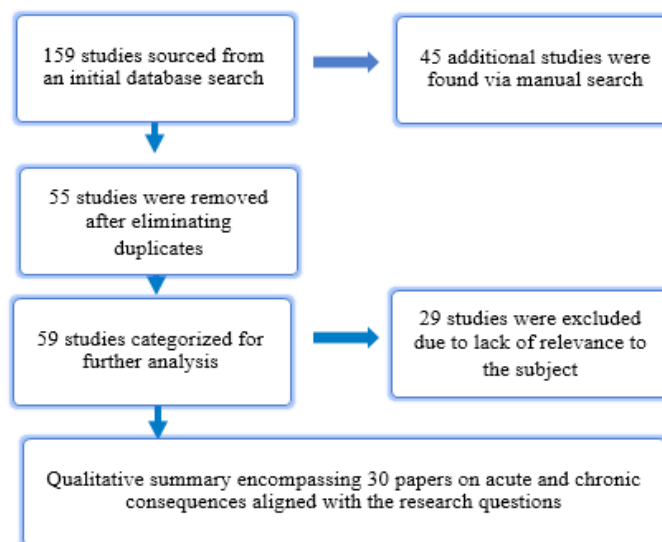


Fig. 1. Pictorial Summary of Literature Search

RESULTS & FINDINGS

Table 1

Results of Initial Search

SN	Search Items	Database	Search limiters	Hits
1	'Perceived Usefulness' AND/OR 'Perceived Ease of Use'	Springer Nature, Global Civil Society, Idea, Inderscience, MDPI	Peer-Reviewed Journals: 2015–2023	35
2	'Technology' AND/OR 'Teachers' AND 'Behavior'	Taylor & Francis, Wiley, Frontiers, SAGE, Science Direct, MDPI, Scope, EXALY, SCILIT, Scopus, ELDIS	Peer-Reviewed Journals: 2015–2023	47
3	Total with duplications removed			26
4	Total removed before 2015			31
5	Total removed with irrelevant variable (students)			20

Table 2

Distribution of Research by Region

(For Studies Conducted in Multiple Countries, All Countries in Question Are Taken into Consideration)

Region (G-S)	No. of Studies	Region (G-N)	No. of Studies
East Asia	18	Africa	06
South Asia	11	Australia	01
Southeast Asia	09	USA	05
Western Asia	17	UK	04
Southwest Asia	02	Europe	07
		Pacific Ocean	01
Total	57	Total	24

Table 3

Pre-Established Codes with Refined Sub-Codes

Teachers	Regions	Institutes
Perceived Ease of use of Technology		
Perceived usefulness	Global North	
Acceptance of technology	Global South	Secondary School Level
Attitude		
Behavior		

Table 4a

Summary of Empirical Articles on Search Phrase 1 (Asian)

Search Phrase 1: Factors influence secondary school teachers' perceptions of technology's use-fulness and ease of use in the classroom					
S#	Author/Year/Locale	Methodology	Demographics	Findings	Recommendations
1	Luo (2022) - China	Exploratory sequential mixed method	516 ESL Teachers 2 Subject Experts (Secondary School)	The findings imply that gamified instructional tools' compatibility in current research settings presents diverse sub-themes, necessitating additional exploration.	By employing a similar research technique, future studies may explore the components affecting PEoU or compatibility.
2	Yang et al., (2021) - China	Quantitative (Online Survey)	1185 Teachers (Primary & Secondary School)	Results indicated that teachers' level of competency in TPACK significantly influenced their acceptance of the e-Schoolbag, with PEoU and PU being the primary mediators.	Teachers intending to successfully integrate and adopt e-Schoolbag in educational settings should be well-versed in both TPACK and specific technical proficiencies for utilizing the e-Schoolbag, as PEoU significantly impacts PU.
3	Hong et al., (2021) - China	Quantitative	1,578 Preschool teachers (Sampled from the National Training Program)	The results highlight that educators in early childhood education concentrate on the acceptance, comprehensibility, and utilization of instructional technology.	Future studies may include preschool educators with diverse demographic backgrounds or global contexts.
4	Islahi (2019) - India	Mixed-Method	482 Teachers (Secondary School)	A significant impact was identified in individuals' perceptions of information technology when considering geographic location, whether in urban or rural areas.	Future studies could involve larger and broader sample sizes, encompassing a wide spectrum of regions nationwide.
5	Ghasemtabar et al., (2019) - Iran	Quantitative	5630 Teachers (Smart High Schools)	Findings in the current study indicated a direct correlation between the utilization of technology and organizational culture encompassing aspects such as mission, adaptability, consistency, and involvement.	The study recommended that innovative school principals and educational system leaders focus on comprehending and promoting organizational culture as a vital component of their plans and initiatives.

Table 4b
Summary of Empirical Articles on Search Phrase 2 (Asian)

Search Phrase 2: Methodologies contributed to secondary school teachers' perceptions of technology's usefulness and ease of use in education					
S#	Author/ Year/ Locale	Methodology	Demographics	Findings	Recommendations
6	Abu-Taieh et al., (2022) - Jordan	Quantitative	551 Teachers (Public & Private Schools)	Findings indicated that, even with implementing an e-learning system in Jordan during the initial phase of COVID-19, teachers mainly relied on widely available mediums like WhatsApp. This illustrates the need for instruction using collaborative systems such as the Darsak platform and Microsoft Teams, emphasizing appropriate tool introductions and comprehensive training.	The study suggests detailed data analysis and results to provide a more holistic perspective. Future research initiatives could explore the enduring effects and adjustments following the COVID-19 pandemic. Future research may analyze the psychological factors associated with e-learning across students, teachers, and guardians.
7	Ghavifekr et al., (2016) - Malaysia	Quantitative	100 Teachers (Secondary School)	Findings indicated a greater integration rate of ICT and digital tools among male instructors than among their female colleagues.	In future studies, maintaining a similar gender distribution may provide more suitable insights into gender perceptions.
8	Hamid et al., (2016) - Malaysia	Quantitative	543 Teachers (Public Schools)	The findings revealed a positive association between PU, PEoU, and the intent to adopt e-government services.	To ensure an effective implementation of an e-government system, the system designers must verify its user-friendly interface and ease of use.
9	Shah et al., (2019) - Pakistan	Quantitative	341 Teachers (High Secondary School)	The findings demonstrate a positive and significant effect of all independent variables on teachers' ICT adoption, considering behavioral intention as a mediating factor.	Government authorities and administrators are recommended to invest more effort and allocate finances and additional resources in implementing programs to promote the increased use of ICT among teachers in educational institutions.
10	David and Aruta (2022) - Philippines	Quantitative	402 Filipino primary education teachers (School)	The findings indicate that the attitude of Filipino teachers towards technology significantly impacts their intent to utilize it.	Future research on technology usage intention factors may incorporate a longitudinal design to mitigate limitations.

Table 4c
Summary of Empirical Articles on Search Phrase 3 (Asian)

Search Phrase 3: Methodologies contributed to secondary school teachers' perceptions of technology's usefulness and ease of use in education					
S#	Author/ Year/ Locale	Methodology	Demographics	Findings	Recommendations
11	Asiri (2019) – Saudi Arabia	Quantitative	157 Female EFL Teachers (Saudi schools)	The findings highlight the significance of attitude, perceived social influence, and PU in predicting teachers' behavioral intentions to integrate gamification.	Future research must explore the regularity or frequency teachers use digital applications in educational settings.
12	Jung (2015) – South Korea	Quantitative	189 EFL Teachers (Middle & High School)	The findings indicate that the behavioral aspects of EFL teachers regarding m-learning can be interpreted through two belief variables: PU and PEoU.	The research framework was developed using only five distinct variables based on related literature. Future research may include new variables to enhance the ability to predict the practical application of m-learning and EFL teachers' intention to integrate technology.
13	Songkram and Osuwan (2022) - Thailand	Quantitative	519 K-12 teachers (Primary & Secondary Schools)	Additionally, the societal context can impact educators' behavioral motives. Alternatively, individuals with importance and influence may impact educators' technology adoption.	The study employed a quantitative method to reveal the significant components impacting teachers' technology acceptance. Future studies may employ qualitative approaches to determine the effect of attitudes on teachers' self-efficacy in integrating technology.

Table 5a
Summary of Empirical Articles on Search Phrase 1 (Global)

Search Phrase 1: Factors influence secondary school teachers' perceptions of technology's use-fulness and ease of use in the classroom					
S#	Author/ Year/ Locale	Methodology	Demographics	Findings	Recommendations
1	Teeroovengadum et al. (2017) – East Africa	Quantitative	365 Teachers (Secondary School)	Findings imply that while demographic variables, mainly qualification, have an effect, this effect becomes statistically insignificant when the TAM elements of PEOU and PU are incorporated into the analysis.	The study was based entirely on data from Mauritius, portraying a focused perspective of a developing nation. Hence, generalizing or drawing broader implications of these findings to other nations requires careful consideration. Therefore, replicating this study in various contexts is suggested.
2	Opoku (2020) - Ghana	Quantitative	131 Lecturers (University)	The findings of this study will assist E-learning system developers in enhancing users' technology adoption by closely addressing these factors during system development.	An exclusive emphasis on lecturers may present a narrowed perspective of software usage. Future studies may examine technology adoption from both teacher and student perspectives.
3	Alshmrany (2018) – South Australia	Mixed method	30 Principals/ Teachers/ Students	This research revealed that the negative correlation between external barriers to ICT adoption by teachers in Saudi Arabia and their behavioral intention was statistically insignificant.	Future research should engage parents in a holistic approach. The influence of parents is fundamental in shaping children's perspectives, and parental support can be highly influential.
4	Ibrahim and Shiring (2022) – USA	Mixed method	5 Federal Colleges of Education, including all Teacher	The results of descriptive statistics indicated a positive perspective towards technology among teachers regarding technology.	The mixed-method approach in this study, combining qualitative and quantitative data, provides significant implications for administrators and educators in Nigerian education, specifically for improving teacher education programs.
5	Liu et al., (2018) - USA	Quantitative	47 K–12 Chinese language teachers (University)	In addition, the external factor significantly impacted both subjective norms and PeoU.	Future studies may use classroom observation's effectiveness to comprehensively analyze the nature of teachers' technology integration within educational settings.

Table 5b
Summary of Empirical Articles on Search Phrase 2 (Global)

Search Phrase 2: Methodologies contributed to secondary school teachers' perceptions of technology's usefulness and ease of use in education					
S#	Author/ Year/ Locale	Methodology	Demographics	Findings	Recommendations
6	Taylor (2019) – USA	Quantitative	K-12 principals	The findings exhibited a moderate and robust statistically significant relationship between the variables of self-directed learning and technology adoption.	The study contributes to positive societal change by fostering awareness and informing administrators about technology adoption.
7	Deslonde and Becerra (2018) - USA	Qualitative dominant crossover mixed analysis	38 School Counselors (Middle and High Schools)	Training, internet connectivity, and bandwidth influenced the attitudes of specific administrators regarding productivity and usage; however, the overall perceptions of Naviance were positive.	Future research should investigate the correlation between the extent of training hours in Naviance and administrator usage.
8	Gyamfi (2016) - UK	Quantitative	400 Pre-service teachers	Pedagogical beliefs were fundamental in shaping pre-service teachers' perceptions of PEOU and PU.	Reshaping teacher training education programs to encompass pedagogical methods that differ from standard lecture-based teaching methodologies is essential.
9	Oyunge (2021) – UK	Quantitative	234 Teachers (Secondary School)	The study results highlighted the similarities between teachers' satisfaction and discrepancies with technology adoption in teaching, reflecting common themes in prior studies.	The study recommended follow-up research involving the same cohort of participating educators from the present research. The investigation may focus on potential changes or stability in their attitudes toward ICT adoption over time.
10	Granić and Marangunić (2019) – UK	Concept-centric approach	71 primary studies	The primary components within TAM (PEOU and PU) are identified as the pivotal components influencing the adoption of educational technology.	The systematic review outcomes offer more precise insight into the concept of TAM acceptance in educational settings, establishing a solid base for future developments in this area of research.

Table 5c
Summary of Empirical Articles on Search Phrase 3 (Global)

Search Phrase 3: Methodologies contributed to secondary school teachers' perceptions of technology's usefulness and ease of use in education					
S#	Author/ Year/ Locale	Methodology	Demographics	Findings	Recommendations
11	Sánchez-Prieto, et al., (2015) - Spain	Quantitative	Teachers (Secondary School)	The study's findings have yielded a set of constructs encompassing behavioral intention relating to adopting technology, PEOU, PU, subjective norm, digital tool anxiety, self-efficacy, facilitating conditions, and perceived excitement.	The current research provides a platform for future research, including a statistical validation procedure to reproduce the study and strengthen the reliability and validity of the findings.
12	Scherer et al. (2019) - Belgium	Meta-Analysis	277 teachers (Pre-service and in-service Teachers)	The study investigated the acceptance of educational technologies among 466 pre-service teachers in Turkey, validating the importance of training these educators in technological innovations and their application in personal and academic development.	Minor adjustments to the standard error and model parameters in the aggregated structural equation may result from reducing the assumption of comparability. However, the model outlined the variance in the structural parameters as a random variance component.
13	Wijnen (2022) - Netherlands	Literature Review	Pre-service & In-service Teachers (Secondary School)	The study pinpointed nine factors associated with primary school teachers' perceptions about using technology in their teaching and four factors linked to their approaches to stimulating higher-order thinking.	Including these scales can offer valuable insight into the frequency with which teachers utilize traditional and innovative technologies and the degree to which these tools are applied to encourage higher-order thinking skills in students.

RESULTS & FINDINGS

Emerging Themes Based on Research Questions in the Asian and Global Context

After a systematic review, several themes emerged corresponding to each research question.

- RQ 1: What factors in current literature influence secondary school teachers' perceptions of technology's usefulness and ease of use in the classroom?

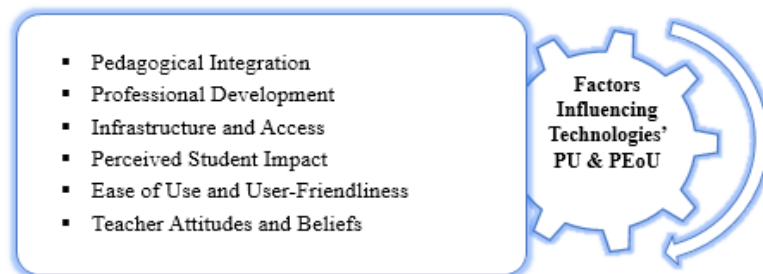


Fig. 2. Themes for factors influencing PU & PEoU in technology among secondary school teachers

- RQ 2: How have previous research methodologies advanced our comprehension of secondary school teachers' perceptions regarding technology's usefulness and ease of use in education?

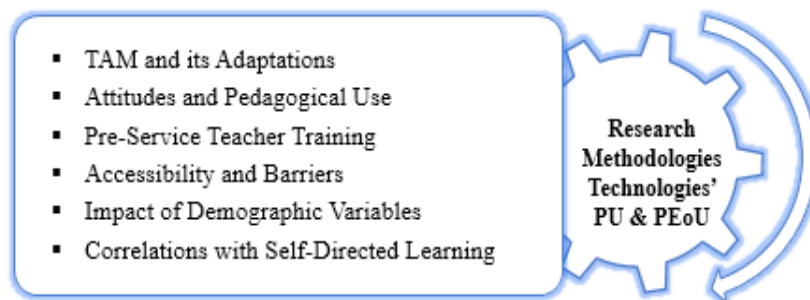


Fig. 3. Themes in methodologies shaping teachers' PU & PEoU in technology use

- RQ 3: What are the primary findings and trends in secondary school teachers' perceptions of technology in different global educational contexts, and how have these evolved?

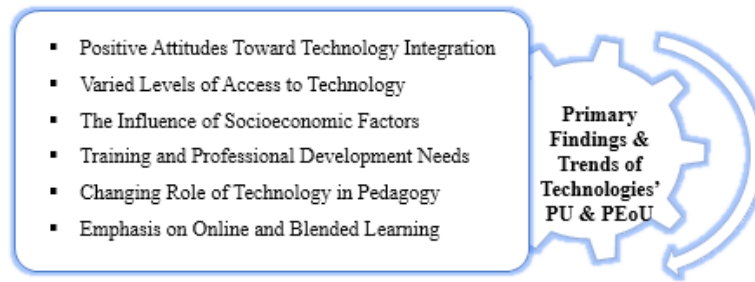


Fig. 4. Themes in technology across global contexts: Teachers' PU & PEoU trends and evolution

- RQ 4: What factors do current studies identify as contributing to secondary school teachers' perceptions of technology's ease of use in classroom environments, and how do these factors affect technology adoption?

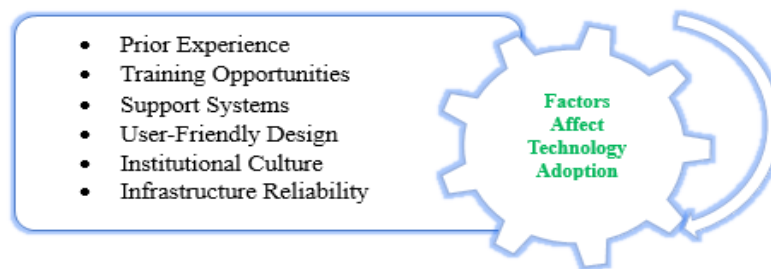


Fig. 5. Themes in classroom environments and how do these factors affect technology adoption

Discussion

The literature review underscores various crucial factors influencing technology's perceived usefulness (PU) in educational settings and recommendations for future research. Luo (2023) highlights the need for subsequent studies with larger sample sizes to understand these factors better. Yang et al., (2021) stress the importance of K-12 teachers acquiring both TPACK knowledge and technical competencies for effective e-schoolbag adoption, a sentiment echoed by Hong et al., (2021), who advocate for diverse teacher backgrounds in research. Additionally, Islahi (2019) emphasizes the need for comprehensive nationwide research on teachers' attitudes toward information technology, while Ghasemtabar et al., (2019) encourage educational leaders to prioritize organizational culture. Abu-Taieh et al., (2022) suggest exploring psychological factors in e-learning, aligning with Ghavifekr et al., (2016), who highlight the significance of overcoming barriers teachers face for improved student outcomes.

Moreover, recommendations by Hamid et al., (2016) and Shah et al., (2021) stress the importance of user-friendly systems and increased resources for ICT programs. David and Aruta (2022) propose employing longitudinal designs to study technology adoption. Asiri (2019) recommends focusing on determinants of male educators' behavioral intentions toward gamification, while Jung (2015) advocates exploring innovative variables for predicting M-learning implementation. Songkram and Osuwan (2022) suggest incorporating system design components into research. These discussions offer precise insights into the complexities of technology integration in education and provide valuable directions for future research endeavors.

CONCLUSION

In summary, the systematic literature review delving into secondary school educators' perspectives on technology's usefulness and ease of use yields valuable insights for curriculum experts and instructional technology practitioners. Notably, the Technology Acceptance Model (TAM) and its variations underscore that educators' adoption of technology in teaching is significantly influenced by perceived ease of use and usefulness. Numerous studies stress the pivotal role of support and training in enhancing teachers'

technology adoption rates. Furthermore, educators' attitudes towards technology play a vital role in its integration into instructional settings, with a positive outlook correlating with higher tendencies for technology incorporation. Challenges persist regarding technology's widespread adoption, primarily due to equipment availability and legal constraints. However, within the TAM framework, perceived usefulness and ease of use are vital determinants significantly impacting ICT adoption, often outweighing demographic variables' influence.

These findings underscore the ongoing need for support, training initiatives, and a deep understanding of teachers' attitudes to effectively integrating technology into secondary education. Such efforts are essential for enhancing students' learning experiences in the digital age.

Recommendations

Develop and maintain robust training programs that enhance teachers' skills and confidence in using technology. These programs should address various levels of technical expertise and emphasize practical applications within the classroom.

Establish dedicated IT support and mentoring systems within schools to provide teachers with ongoing assistance and foster a culture of collaboration. This support network can encourage technology adoption by helping educators navigate challenges and share best practices.

Encourage school leadership to create an environment that supports technological innovation and experimentation. This can be achieved through policies that reward technology integration, regular professional development opportunities, and open communication about the benefits and challenges of educational technology.

Competing Interest

The author had no competing interests.

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