Al-Ishlah: Jurnal Pendidikan
Vol.18, 1 (March, 2026), pp. 483-494
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v18i1.9160

A Decade of UTAUT in Education: A PRISMA 2020 Systematic Review of Technology Acceptance Studies (2015–2025)

Agus Widayoko[1], Syunu Trihantoyo[2], Nunuk Hariyati[3]

[1] Universitas Negeri Surabaya, Surabaya, Indonesia; widayokoagus22@gmail.com
[2] Universitas Negeri Surabaya, Surabaya, Indonesia; widayokoagus22@gmail.com
[3] Universitas Negeri Surabaya, Surabaya, Indonesia; widayokoagus22@gmail.com

ARTICLE INFO

Keywords:

systematic review,
educational technology adoption;
UTAUT;
learning management system

Article history:

Received 2025-12-11
Revised 2026-01-11
Accepted 2026-03-30

ABSTRACT

The increasing integration of digital technologies in education, particularly during and after the COVID-19 pandemic, has intensified interest in understanding technology acceptance. The Unified Theory of Acceptance and Use of Technology (UTAUT) has been widely applied in educational research; however, existing reviews remain fragmented and lack a longitudinal, model-focused synthesis. This study employed a PRISMA 2020–guided systematic literature review of UTAUT-based research in educational contexts published between 2015 and 2025. A structured search of the Scopus database identified 13,131 records. Following duplicate removal and multi-stage screening based on predefined inclusion criteria, 56 empirical journal articles were retained. Study quality was assessed using a combined framework integrating the Mixed Methods Appraisal Tool (MMAT) and Kitchenham's checklist. Data were analysed using descriptive and thematic synthesis. Findings indicate a substantial increase in UTAUT-based studies during the COVID-19 period, with e-learning, mobile learning, and learning management systems as dominant technologies. Quantitative approaches, particularly Structural Equation Modelling, predominated. Performance Expectancy emerged as the most consistent predictor of behavioural intention, followed by Effort Expectancy, Social Influence, and Facilitating Conditions. Research remains geographically concentrated in Asia and largely focused on behavioural intention rather than actual use behaviour. This review highlights the sustained relevance of UTAUT in educational technology research while identifying methodological and conceptual gaps, including limited attention to learning outcomes, overreliance on cross-sectional designs, and emerging extensions related to AI-enabled learning. Future research should integrate longitudinal and mixed-method approaches and align technology acceptance with educational effectiveness.

Corresponding Author:
Agus Widayoko
Universitas Negeri Surabaya, Surabaya, Indonesia; widayokoagus22@gmail.com

1. INTRODUCTION

Over the past decade, the education sector has undergone a substantial transformation driven by the accelerated integration of digital technologies into teaching, learning, and institutional practices (Raman & Don, 2015; Yakubu & Dasuki, 2019). Technologies such as learning management systems (LMS), mobile learning applications, cloud-based platforms, and online assessment tools have increasingly become embedded in formal education systems, reshaping instructional delivery, expanding access to learning resources, and altering interactions among students, educators, and institutions (Nikou & Economides, 2017; Sharma & Sharma, 2019). The pace and scale of this transformation intensified during the COVID-19 pandemic, when educational institutions worldwide were forced to rapidly adopt technology-mediated learning in response to campus closures and social distancing measures (Al-Azawei et al., 2017; Sangeetha & Sivaprakash, 2022).

In this study, digital transformation in education is understood as the sustained and systemic integration of digital technologies into educational processes to support learning, teaching, assessment, and institutional operations (Kittinger & Law, 2024). Rather than being treated as a single measurable construct, digital transformation is operationalised as a contextual and temporal lens through which technology acceptance research is examined. Specifically, it is reflected in the types of technologies investigated, shifts in research focus across the pre-pandemic, pandemic, and post-pandemic periods, and the increasing attention to advanced and intelligent educational technologies (Raghu et al., 2018). This operationalisation enables an examination of how technology acceptance research evolves alongside broader digital change without imposing artificial measurement boundaries.

Understanding the factors that influence individuals' acceptance and use of educational technologies has therefore become a central concern for researchers, policymakers, and practitioners (Muflih et al., 2021). Technology adoption in education is shaped not only by technical availability but also by users' perceptions, attitudes, institutional support, and contextual conditions (Granić, 2022). As digital learning environments become increasingly complex and pervasive, theoretical frameworks that explain technology acceptance play a critical role in guiding empirical inquiry and informing educational policy and technology design (Nikolic et al., 2024).

The Unified Theory of Acceptance and Use of Technology (UTAUT), originally proposed by Venkatesh et al. (2003), synthesises eight foundational theories of technology acceptance into a unified model comprising four core determinants: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. The model has demonstrated strong explanatory power across a wide range of technological contexts and has been extensively applied to examine behavioural intention and use behaviour in information systems and educational settings (Zhou, (2022).

In educational research, UTAUT has been widely employed to investigate the adoption of diverse technologies, including e-learning platforms, mobile learning applications, LMS, virtual learning environments, and digital assessment systems (Sharma & Chandel, (2020). More recently, the model has been applied to emerging domains, including AI-enabled tutoring systems, learning analytics, conversational agents, and adaptive learning technologies (Kittinger & Law, 2024). These applications illustrate UTAUT's flexibility while also raising questions about its capacity to capture new psychological, ethical, and contextual dimensions of intelligent, data-driven educational systems.

The original UTAUT model has been re-examined and extended over time. Notably, Chao, (2019) revisited UTAUT and reaffirmed its robustness while highlighting the need for contextual adaptation and theoretical refinement. In addition, UTAUT2 introduced further constructs, such as hedonic motivation, price value, and habit, to enhance the model's applicability in consumer-oriented contexts (Zhou, (2022). In educational settings, both UTAUT and UTAUT2 have been adopted, often with additional extensions that incorporate constructs such as trust, self-efficacy, digital competence, and technology anxiety (Raghu et al., 2018).

In this review, UTAUT is treated as the core analytical framework, while studies employing UTAUT2 are included when the model is explicitly adapted for educational contexts. Rather than analysing UTAUT and UTAUT2 as separate models, both are examined within a unified analytical

scope, with particular attention given to how additional constructs are incorporated and interpreted in educational technology adoption research. This approach reflects the structure of the existing literature, in which distinctions between UTAUT, UTAUT2, and extended models are often fluid and context-dependent.

Despite the extensive application of UTAUT in education, existing reviews of technology acceptance research remain fragmented. Many prior reviews adopt a broad, model-agnostic perspective, synthesising studies based on multiple acceptance frameworks without focusing specifically on UTAUT (Sharma & Chandel, 2020; Zhou, 2022). Others concentrate on particular technologies, educational levels, or geographic regions, limiting their ability to capture longitudinal developments and cross-contextual patterns (Chao, 2019; Nikolic et al., 2024). Moreover, few reviews explicitly examine how UTAUT-based research has evolved across periods of major disruption and change, particularly during and after the COVID-19 pandemic (Granić, 2022).

Based on a critical assessment of the existing literature, several research gaps can be identified:

1. There is a lack of systematic reviews that focus exclusively on UTAUT-based studies within educational contexts.
2. Existing reviews rarely provide a longitudinal synthesis covering a full decade of research across diverse technologies and educational settings.
3. The impact of the COVID-19 pandemic on UTAUT-based educational research has not been comprehensively synthesised.
4. The relative influence of core UTAUT constructs across different technologies, educational levels, and geographic regions remains insufficiently consolidated.
5. Emerging extensions of UTAUT, particularly those related to AI-enabled and advanced digital learning technologies, have not been systematically examined.

To address these gaps, this study conducts a PRISMA 2020–based systematic literature review of UTAUT research in education published between 2015 and 2025. By adopting a transparent, replicable review protocol, this study aims to map publication trends, research contexts, methodological approaches, and theoretical developments in UTAUT over the past decade.

The review is guided by the following research questions (RQs):

RQ1: How have publication trends of UTAUT-based studies in education evolved from 2015 to 2025?
RQ2: What educational contexts and technology types are most frequently examined using UTAUT?
RQ3: What methodological approaches dominate UTAUT research in educational settings?
RQ4: Which UTAUT constructs most consistently influence behavioural intention and use behaviour?
RQ5: What extensions of UTAUT have emerged in educational research, particularly in relation to AI-enabled and advanced digital learning technologies?

By addressing these research questions, this review provides a structured, data-driven synthesis of how UTAUT has been applied and adapted in education over the past decade of digital change. The findings aim to contribute to theoretical refinement by clarifying construct-level patterns and emerging extensions of UTAUT, while also offering practical insights for educators, policymakers, and technology developers seeking to design and implement effective digital learning systems in an increasingly complex educational ecosystem.

2. METHODS

This study employed a Systematic Literature Review (SLR) design to synthesise empirical research applying the Unified Theory of Acceptance and Use of Technology (UTAUT) within educational contexts. The review followed the PRISMA 2020 guidelines to ensure transparency, methodological rigour, and reproducibility. A predefined review protocol guided the search strategy, screening process, data extraction, and quality appraisal procedures. However, the review protocol was not formally registered in repositories such as PROSPERO or the Open Science Framework (OSF). This decision was primarily due to the exploratory and mapping-oriented nature of the review and institutional constraints at the time of study initiation. To mitigate potential risks associated with non-

registration, all methodological steps, criteria, and analytical decisions are reported explicitly in this article.

The Scopus database was used as the sole data source for this review. Scopus was selected for its broad multidisciplinary coverage, rigorous indexing standards, and strong representation of high-impact journals in educational technology, information systems, and the social sciences. Scopus also provides advanced filtering options and consistent metadata, which are particularly suitable for longitudinal trend analysis and systematic screening.

Although other databases, such as Web of Science (WoS), ERIC, and IEEE Xplore, are relevant to educational technology research, they were not included in this review for several reasons. WoS has more limited coverage of applied educational technology journals than Scopus. ERIC focuses primarily on education but offers less comprehensive indexing of information systems and technology acceptance research, and IEEE Xplore predominantly indexes conference proceedings and engineering-oriented publications, which fall outside the scope of this review. Given the study's focus on peer-reviewed journal articles and theoretical applications of UTAUT, Scopus was deemed sufficient and appropriate as a primary source.

Nevertheless, reliance on a single database may introduce disciplinary and publication bias, potentially favouring journals and regions that are more strongly represented in Scopus. This limitation is addressed in the discussion section, and future reviews are encouraged to adopt multi-database strategies to enhance coverage.

The search was conducted using a structured Boolean query refined through iterative testing: ("UTAUT" OR "Unified Theory of Acceptance and Use of Technology") AND ("education" OR "educational" OR "learning" OR "digital learning") AND ("technology adoption" OR "ICT integration" OR "digital transformation") The search was limited to publications from January 2015 to February 2025 to capture a full decade of research development.

All retrieved records were exported from Scopus and imported into Mendeley reference management software for organisation and duplicate removal. A total of 13,131 records were initially identified, of which 1,842 duplicate records were removed automatically and manually using Mendeley's duplicate detection function. The screening process followed the PRISMA stages of identification, screening, eligibility, and inclusion. Titles and abstracts were first screened to exclude studies unrelated to UTAUT, education, or technology acceptance. Full-text screening was subsequently conducted to assess theoretical alignment, methodological clarity, and relevance to the review objectives.

A single primary reviewer conducted the screening and eligibility assessment. To mitigate potential selection bias associated with single-reviewer screening, approximately 15% of the excluded and included articles were randomly selected and independently reviewed by a second academic colleague with expertise in educational technology. Discrepancies were discussed until consensus was reached. Formal inter-rater reliability statistics (e.g., Cohen's kappa) were not calculated, which is acknowledged as a limitation of this review.

To enhance transparency, the inclusion and exclusion criteria applied during the screening process are summarised in Table 1.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	Conference papers, book chapters, editorials, notes
Published in English	Non-English publications
Empirical studies (quantitative, qualitative, or mixed methods)	Conceptual papers or non-empirical reviews
Explicit use of UTAUT or UTAUT2 as the main theoretical framework	Studies using other acceptance models without UTAUT

Inclusion Criteria	Exclusion Criteria
Educational context (K–12, higher education, vocational, teacher education)	Non-educational contexts
Full-text accessible through institutional or publisher access	Articles with inaccessible full texts

Full-text accessibility was not restricted to open-access publications. Articles were included as long as full texts could be accessed via institutional subscriptions or publisher platforms. Therefore, open-access status was not used as an exclusion criterion, reducing potential access-related bias.

The methodological quality of the included studies was assessed using a combined appraisal framework integrating the Mixed Methods Appraisal Tool (MMAT) and Kitchenham's quality checklist. MMAT was used to evaluate the appropriateness of study design, data collection, and analytical rigour across qualitative, quantitative, and mixed-method studies. At the same time, Kitchenham's criteria focused on the clarity of research objectives, the validity of the instruments, the adequacy of the analysis, and the transparency of the reporting. Each study was assessed against a set of predefined quality indicators derived from both tools. Studies were required to meet a minimum methodological adequacy threshold, defined as demonstrating clear research objectives, appropriate application of UTAUT constructs, and sufficient methodological transparency. Studies failing to meet these minimum criteria were excluded during the eligibility phase. Quality appraisal results informed inclusion decisions but were not used to weight studies during synthesis.

Data extraction was conducted using a structured protocol capturing bibliographic information, educational context, participant characteristics, technology type, UTAUT constructs, extended variables, methodological approach, and key findings. The extracted data were synthesised using descriptive and thematic analysis. Descriptive analysis was used to map publication trends, research contexts, technologies, and methods, while thematic synthesis identified recurring constructs, extensions of UTAUT, and emerging themes, including AI-enabled learning technologies.

Given the exclusive use of the Scopus database, a sensitivity consideration is warranted. Scopus-only coverage may bias the sample toward certain disciplines, journals, and geographic regions, particularly those with strong representation in international English-language journals. As a result, relevant studies indexed exclusively in regional or specialised databases may not be captured. This limitation is acknowledged, and findings should be interpreted as representative of Scopus-indexed UTAUT research in education, rather than the entirety of global scholarship on the topic.

3. FINDINGS AND DISCUSSION

3.1 Findings

The study selection process followed the PRISMA 2020 framework and is summarised in Figure 1. A total of 13,131 records were identified through a structured search of the Scopus database (search conducted in February 2025). After importing all records into reference management software, 1,842 duplicates were removed, leaving 11,289 unique records for screening. During the initial screening stage, titles, abstracts, and keywords were examined to assess relevance to UTAUT, technology acceptance, and educational contexts, resulting in the exclusion of 10,693 records that did not meet the inclusion criteria. Consequently, 596 articles were retained for full-text assessment. In the eligibility stage, full texts were reviewed to evaluate theoretical alignment, methodological clarity, and relevance to the review objectives. At this stage, 484 articles were excluded due to insufficient application of UTAUT, inadequate methodological transparency, or lack of relevance to educational technology adoption. Ultimately, 56 studies met all inclusion criteria and were retained for synthesis and analysis. This structured selection process ensured consistency, transparency, and methodological rigour in constructing the final dataset.

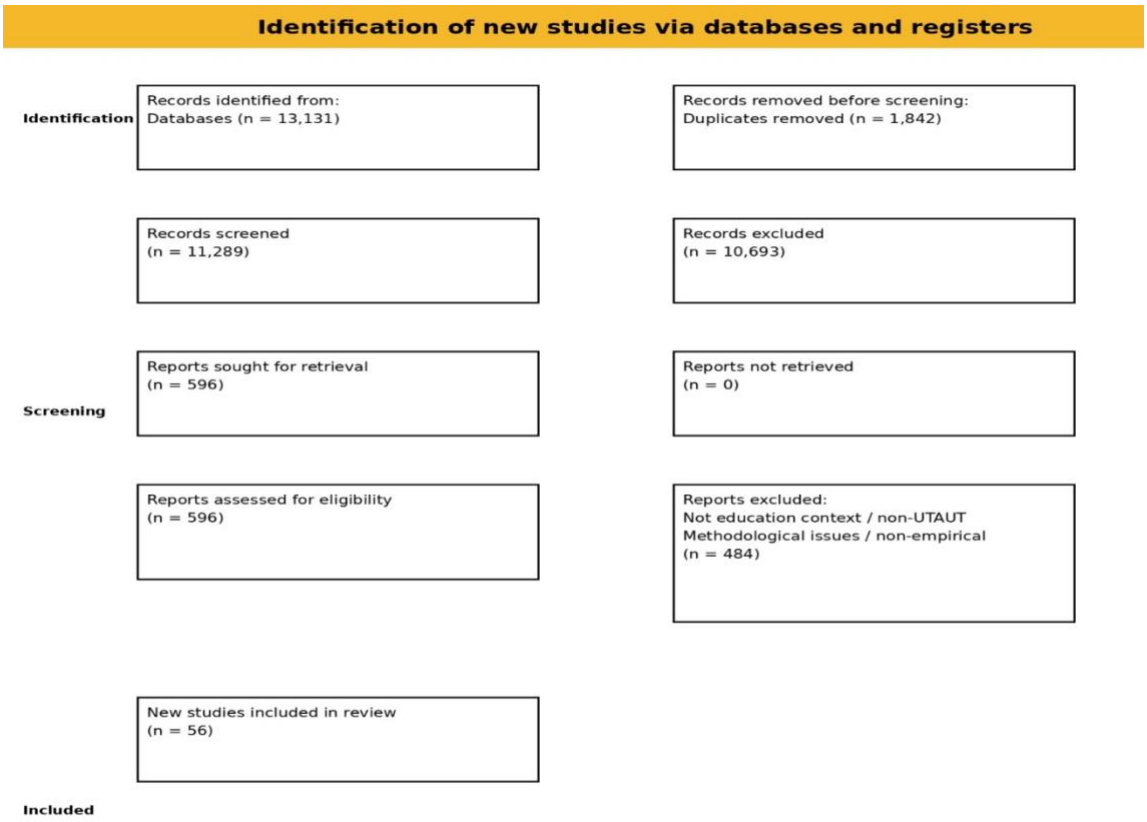

Figure 1. PRISMA Steps Analysis

Figure 1 illustrates the study selection process following the PRISMA 2020 guidelines. From an initial retrieval of 13,131 records from the Scopus database, 1,842 duplicates were removed before screening. After title and abstract screening, 596 full-text articles were assessed for eligibility, resulting in a final sample of 56 studies included in this review.

Table 2 presents the annual distribution of UTAUT-based studies in education from 2015 to 2025. All data were extracted from Scopus-indexed journal articles, with 2025 representing a partial year (January–February only).

Table 2. Annual Distribution of UTAUT Studies in Education (Scopus, 2015–2025)

Year	Number of Studies	Interpretation
2015	1	Early digital adoption stage
2016	0	No relevant publications
2017	2	Initial steady growth
2018	4	Expansion of digital learning initiatives
2019	5	Widening use of technology in education
2020	9	Sharp increase due to COVID-19 pandemic
2021	11	Peak of remote learning research
2022	10	Transition toward hybrid learning models
2023	8	Shift toward AI-driven learning technologies
2024	4	Stabilization of research output
2025*	2	Early-year publications
Total	**56**	

The absence of publications in 2016 reflects the application of the predefined search and screening criteria rather than intentional exclusion. Specifically, no Scopus-indexed journal articles published in that year met all inclusion criteria, particularly the requirement for explicit and central use of UTAUT within an educational context. The results indicate a gradual increase in publications between 2017 and 2019, followed by a pronounced surge from 2020 to 2022, corresponding with the global shift toward remote and digitally mediated learning during the COVID-19 pandemic. Although a slight decline is observed after 2023, this pattern is more appropriately interpreted as a stabilization rather than a reduction in scholarly interest, as reflected in the continued diversification of educational technologies examined in recent studies.

Six thematic technology categories were identified across the 56 included studies. As shown in Table 3, e-learning, mobile learning, and learning management systems (LMS) constitute the largest groups, reflecting their widespread adoption during the pandemic and early phases of digital transformation in education.

Table 3. Distribution of Technology Topics in UTAUT-Based Educational Studies

Topic Category	Number of Studies	Percentage
E-learning	18	32%
Mobile Learning	12	21%
Learning Management Systems (LMS)	10	18%
Artificial Intelligence in Education	8	14%
Digital Learning Platforms (General)	5	9%
Hybrid Learning / Smart Classroom	3	6%

Topic coding followed a single-label classification approach, assigning each article a single dominant category based on its primary technological focus. For instance, studies examining mobile access to LMS platforms were classified as mobile learning when mobility constituted the main analytical emphasis. Any ambiguities in classification during data extraction were resolved through discussion. The "AI in education" category encompasses studies focusing on intelligent tutoring systems, learning analytics, conversational agents (chatbots), adaptive learning systems, and generative AI applications explicitly situated in educational contexts. While AI-related studies remain comparatively few, their presence in the dataset indicates an emerging research focus on advanced, intelligent educational technologies.

UTAUT research in educational contexts is predominantly quantitative, with Structural Equation Modelling (SEM) serving as the most frequently employed analytical approach, reflecting the latent nature of UTAUT constructs.

Table 4. Methodological Approaches in UTAUT-Based Educational Research

Method	Number of Studies	Percentage
SEM (PLS or AMOS)	34	61%
Descriptive Survey	12	22%
Mixed Methods	5	9%
Qualitative	2	4%
Systematic Review / Bibliometric	3	4%
Total	**56**	**100%**

To enhance methodological clarity, SEM-based studies were further disaggregated into PLS-SEM and covariance-based SEM (AMOS), where reporting permitted. PLS-SEM was more commonly applied, particularly in exploratory studies and contexts with smaller sample sizes, whereas CB-SEM was typically used in confirmatory analyses involving larger datasets. The "descriptive survey"

category refers to studies that utilized survey instruments and analysed them using descriptive or inferential statistical techniques (e.g., regression or correlation) without latent variable modelling. Although SEM-based studies are also survey-driven, they were classified separately because they rely on measurement and structural models. While the dominance of SEM-based approaches aligns with UTAUT's theoretical structure, the relatively limited number of qualitative and mixed-methods studies suggests a methodological imbalance that may constrain deeper contextual and explanatory insights.

Table 5. Frequency of Significant UTAUT Paths Across Included Studies

UTAUT Construct	Number of Significant Reports	Percentage	Interpretation
Performance Expectancy (PE)	48	86%	Most consistent predictor of BI
Effort Expectancy (EE)	42	75%	Strong influence, especially for new technologies
Social Influence (SI)	35	62%	Higher relevance in K–12 settings
Facilitating Conditions (FC)	33	59%	Important in developing regions
Behavioral Intention (BI)	56	100%	Primary outcome variable
Use Behavior (UB)	29	52%	Not all studies measured actual usage

To avoid overstating findings, this review adopts a vote-counting approach, in which the influence of each UTAUT construct is assessed by the proportion of studies reporting statistically significant relationships. Accordingly, interpretations are based on the frequency of significance rather than the magnitude of the effect size. Performance Expectancy (PE) was tested in all 56 studies and was found to be significant in 48 (86%). Effort Expectancy (EE) was substantial in 42 of 56 studies (75%), followed by Social Influence (SI) in 35 studies (62%) and Facilitating Conditions (FC) in 33 studies (59%). Behavioural Intention (BI) was measured in all included studies, whereas Use Behaviour (UB) was examined in only 29 studies (52%). The limited attention to actual use behaviour indicates a prevailing emphasis on intention rather than realised technology use, highlighting an important gap and underscoring the need for future research to incorporate objective usage indicators, such as system log data.

UTAUT-based educational studies are geographically concentrated, with a substantial proportion conducted in Asia.

Table 6. Geographic Distribution of UTAUT-Based Educational Studies

Region	Number of Studies	Percentage
Asia	32	57%
Europe	10	18%
Middle East	6	11%
Africa	4	7%
North America	3	5%
Others	1	2%

Geographic assignment was based on the country in which empirical data were collected rather than the institutional affiliation of the first author. Asia accounts for the largest share of studies, followed by Europe and the Middle East. This distribution reflects both accelerated digitalization initiatives in these regions and their strong representation within Scopus-indexed journals. To support more granular cross-cultural analysis, future studies may benefit from complementary visualizations such as country-level maps or rankings of the most frequently studied countries.

Overall, the results demonstrate a marked increase in UTAUT-based educational research during the pandemic period, a strong reliance on SEM-based quantitative methodologies, and consistent reporting of Performance Expectancy as the most frequently significant predictor of behavioural intention. At the same time, the findings reveal persistent gaps, including limited measurement of actual use behaviour, underrepresentation of qualitative approaches, and a still-emerging focus on AI-enabled educational technologies.

3.2 Discussion

This systematic review provides a consolidated understanding of how the Unified Theory of Acceptance and Use of Technology (UTAUT) has been applied in educational research over the past decade. Rather than reiterating descriptive results, this discussion interprets key patterns identified in the review, links technology acceptance to broader educational outcomes, and highlights implications for future research design, policy, and practice.

The marked increase in UTAUT-based studies during the COVID-19 pandemic reflects the urgent need to sustain educational continuity through digital technologies (Tan, 2021). Beyond documenting heightened adoption, the reviewed studies indicate that technology acceptance plays a critical role in shaping learning effectiveness and instructional continuity, particularly in emergency remote teaching contexts (Alqahtani & Rajkhan, 2020). When learners and educators perceive digital systems as useful and manageable, technologies are more likely to be integrated meaningfully into pedagogical practices rather than serving as mere substitutes for face-to-face instruction (Suki & Suki, 2017).

Performance Expectancy emerged as the most frequently significant determinant of behavioural intention across the reviewed studies. From an educational perspective, this finding suggests that users are more inclined to adopt digital technologies when they perceive clear benefits for learning outcomes, instructional efficiency, or task performance (Bansal et al., 2023). Technologies that support content understanding, timely feedback, assessment processes, and instructional organisation are therefore more likely to be accepted and sustained in educational practice. This reinforces arguments that educational technologies should be evaluated primarily in terms of their pedagogical value rather than their technical sophistication alone (Al Mulhim, 2021).

Effort Expectancy was also found to exert a substantial influence on behavioural intention, particularly in studies examining mobile learning and AI-enabled educational technologies (Oke & Fernandes, 2020). In educational settings, this highlights the importance of usability and cognitive load. Systems that are difficult to navigate or poorly aligned with users' digital competence may increase teacher workload and reduce student engagement, even when they offer advanced functionalities (Al-Maroof et al., 2021). Ease of use thus has direct implications for instructional efficiency, educators' willingness to integrate technology, and learners' sustained participation.

Social Influence demonstrated context-dependent effects, with stronger relevance in primary and secondary education settings. This finding aligns with prior research suggesting that teacher expectations, peer norms, and institutional culture exert greater Influence on younger learners' technology-related behaviours (Tolba & Youssef, 2022). In contrast, its weaker Influence in higher education contexts reflects greater learner autonomy and self-regulation (Zapata-Cuadrado & Rodríguez, 2021). Facilitating Conditions were particularly salient in studies conducted in developing regions, underscoring persistent challenges related to infrastructure, technical support, and institutional readiness (Oke & Fernandes, 2020; Al Mulhim, 2021). These findings highlight ongoing concerns about equity and access in educational technology adoption.

An important insight from this review is that UTAUT-based research in education has predominantly focused on behavioural intention rather than actual educational outcomes. While acceptance is a necessary precondition for technology use, it does not automatically translate into improved learning achievement or instructional quality (Teo, 2019). The limited measurement of use behaviour and outcome-related indicators suggests a disconnect between technology acceptance research and broader educational effectiveness (Zapata-Cuadrado & Rodríguez, 2021).

Future UTAUT studies should therefore extend beyond adoption metrics to examine how accepted technologies influence student engagement, learning achievement, assessment quality, and teacher workload (Granić, 2022). Moreover, the prominence of Facilitating Conditions in contexts with uneven digital infrastructure highlights the need to consider structural constraints when interpreting acceptance outcomes. Without adequate institutional support and resources, technology adoption may inadvertently reinforce existing educational inequalities (Oke & Fernandes, 2020).

The findings of this review also have important implications for the design of future educational technology research. First, the dominance of cross-sectional survey designs and Structural Equation Modelling (SEM) raises concerns related to common method bias and limited causal inference (Dwivedi et al., 2019). Future research would benefit from longitudinal designs, experimental approaches, and mixed-method studies that capture changes in acceptance and use over time (Tolba & Youssef, 2022).

Second, sampling strategies require greater attention. Many reviewed studies relied heavily on convenience samples, particularly university students, which limits generalisability (Chao, 2019). Expanding research to include teachers, school-level contexts, and underrepresented regions would strengthen external validity and provide a more balanced understanding of technology acceptance in education (Kittinger & Law, 2024).

Third, as UTAUT continues to be extended to AI-enabled and data-driven learning systems, issues of measurement validity become increasingly salient. Constructs such as trust in AI, perceived intelligence, and technology anxiety require careful operationalisation to avoid conceptual overlap and ambiguity (Chang & Chen, 2020; Nikolic et al., 2024). Researchers should complement self-reported measures with objective indicators of use, such as system logs or learning analytics data, to better capture actual technology adoption (Raghu et al., 2018).

From a policy and practice perspective, the findings of this review suggest several actionable priorities. First, professional development initiatives should focus not only on technical skills but also on pedagogical integration, enabling educators to align digital tools with instructional goals and learning outcomes (Al-Maroof et al., 2021). Training programs that emphasise pedagogical value may enhance both acceptance and effective use.

Second, sustained investment in digital infrastructure and institutional support remains critical, particularly in contexts where Facilitating Conditions strongly influence adoption (Chang & Chen, 2020). Policymakers should ensure that digital transformation strategies address connectivity, device access, and ongoing technical assistance to promote equitable participation.

Third, technology developers and educational institutions should prioritise usability testing and user-centred design. Systems that minimise cognitive load and align with educators' workflows are more likely to be adopted sustainably and to support meaningful student engagement (Sharma & Sharma, 2019). Incorporating feedback from both teachers and learners during system design and implementation can significantly enhance acceptance and educational impact.

Overall, this review demonstrates that while UTAUT remains a robust framework for understanding technology acceptance in education, its continued relevance depends on closer integration with educational outcomes, methodological rigour, and practical implementation considerations. By aligning acceptance research with learning effectiveness, equity, and instructional quality, future studies can contribute more directly to evidence-based digital transformation in education (Teo, 2019).

4. CONCLUSION

This systematic review synthesised UTAUT-based research in educational contexts published between 2015 and 2025, providing an integrated overview of publication trends, research contexts, methodological approaches, and construct-level findings. The results indicate a substantial increase in UTAUT applications during the COVID-19 pandemic, with e-learning, mobile learning, and learning management systems as the most frequently examined technologies. Across studies, Performance Expectancy was most consistently reported as a significant predictor of behavioural intention, while

Effort Expectancy, Social Influence, and Facilitating Conditions showed context-dependent effects. At the same time, the limited measurement of actual use behaviour highlights an ongoing emphasis on intention rather than realised educational use.

Methodologically, this review contributes by applying a transparent PRISMA 2020–based protocol and a combined quality appraisal framework to systematically map a decade of Scopus-indexed UTAUT studies in education. This approach offers a structured reference for future reviews seeking to synthesise technology acceptance research with greater methodological clarity and consistency. From a practical perspective, the findings underscore the importance of aligning educational technologies with perceived learning benefits, usability, and adequate institutional support. Policymakers, educators, and technology designers are encouraged to prioritise pedagogical value, user-centred design, and equitable infrastructure to support meaningful and sustainable digital transformation in education.

REFERENCES

Al-Azawei, A., Parslow, P., & Lundqvist, K. (2017). Barriers and opportunities of e-learning implementation in Iraq. *Smart Learning Environments*, *4*(12). https://doi.org/10.1186/s40561-017-0051-5

Al-Maroof, R. A., Alhumaid, K., & Salloum, S. A. (2021). Continuous intention to use e-learning: UTAUT2 perspective. *Education and Information Technologies*, *26*. https://doi.org/10.1007/s10639-020-10335-x

Al Mulhim, E. N. (2021). Flipped learning acceptance among university students: UTAUT. *Education and Information Technologies*, *26*. https://doi.org/10.1007/s10639-021-10572-3

Alqahtani, M. A., & Rajkhan, A. A. (2020). E-learning in higher education during COVID-19: UTAUT approach. *Education and Information Technologies*, *25*. https://doi.org/10.1007/s10639-020-10221-z

Bansal, S., Garg, I., & Padariya, R. (2023). Adoption of AI tools in engineering education: UTAUT2 approach. *Computers & Education: Artificial Intelligence*, *4*. https://doi.org/10.1016/j.caeai.2023.100129

Chang, C.-T., & Chen, C.-W. (2020). Augmented reality adoption in higher education: Extending UTAUT. *Interactive Technology and Smart Education*, *17*(4). https://doi.org/10.1108/ITSE-06-2020-0090

Chao, C.-M. (2019). Factors determining the behavioral intention to use mobile learning. *Journal of Advanced Nursing*, *75*(3). https://doi.org/10.1111/jan.13832

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT). *Information Systems Frontiers*, *21*. https://doi.org/10.1007/s10796-017-9774-y

Granić, A. (2022). Educational technology adoption: A systematic review. *Education and Information Technologies*, *27*(7). https://doi.org/10.1007/s10639-022-10951-7

Kittinger, L., & Law, V. (2024). A systematic review of the UTAUT and UTAUT2 among K–12 educators. *Journal of Information Technology Education: Research*, *23*. https://doi.org/10.28945/5246

Muflih, S. M., Abuhamdah, M., & Karasneh, R. (2021). Exploring medical students' intention to use mobile learning: A UTAUT2 study. *BMC Medical Education*, *21*. https://doi.org/10.1186/s12909-021-02625-w

Nikolic, S., Wentworth, I., Sheridan, L., Moss, S., Duursma, E., & Middleton, R. (2024). Adoption of AI in higher education: A UTAUT analysis. *Australasian Journal of Educational Technology*, *40*(6). https://doi.org/10.14742/ajet.9643

Nikou, S. A., & Economides, A. A. (2017). Mobile-based assessment acceptance in higher education. *Computers & Education*, *109*. https://doi.org/10.1016/j.compedu.2017.02.014

Oke, A., & Fernandes, P. O. (2020). Students' acceptance of mobile learning apps: UTAUT2. *Education and Information Technologies*, *25*. https://doi.org/10.1007/s10639-020-10188-x

Raghu, T. S., Sinha, R. K., & Vinze, A. (2018). Understanding learning management systems adoption

through UTAUT. *Decision Support Systems*, *112*. https://doi.org/10.1016/j.dss.2018.06.007

Raman, A., & Don, Y. (2015). Acceptance of LMS in Malaysian universities: UTAUT. *Education and Information Technologies*, *20*. https://doi.org/10.1007/s10639-013-9298-1

Sangeetha, N., & Sivaprakash, P. (2022). Faculty adoption of AI-based teaching assistants: UTAUT study. *Journal of Computing in Higher Education*, *34*. https://doi.org/10.1007/s12528-022-09308-1

Sharma, S. K., & Chandel, J. K. (2020). UTAUT in educational technology: A systematic review. *Education and Information Technologies*, *25*. https://doi.org/10.1007/s10639-019-09971-4

Sharma, S. K., & Sharma, H. (2019). Examining UTAUT in mobile learning adoption. *Education and Information Technologies*, *24*. https://doi.org/10.1007/s10639-018-9773-3

Suki, N. M., & Suki, N. M. (2017). Determinants of mobile learning adoption: A UTAUT2 perspective. *Journal of Educational Computing Research*, *56*(4). https://doi.org/10.1177/0735633117737356

Tan, P. J. B. (2021). Students' adoption of AI-based education tools using UTAUT. *Interactive Learning Environments*, *29*(5). https://doi.org/10.1080/10494820.2019.1709210

Teo, T. (2019). Comparing UTAUT and UTAUT2 in explaining teachers' intention to use technology. *Interactive Learning Environments*, *27*(4). https://doi.org/10.1080/10494820.2018.1546744

Tolba, E. G., & Youssef, N. H. (2022). High school science teachers' acceptance of using distance education in light of UTAUT. *Eurasia Journal of Mathematics, Science and Technology Education*, *18*(9). https://doi.org/10.29333/ejmste/12365

Yakubu, M. N., & Dasuki, S. (2019). Adoption of e-learning using UTAUT. *Education and Information Technologies*, *24*. https://doi.org/10.1007/s10639-018-9798-7

Zapata-Cuadrado, M., & Rodríguez, M. A. (2021). University students' acceptance of virtual learning environments based on UTAUT. *Interactive Technology and Smart Education*, *18*(2). https://doi.org/10.1108/ITSE-05-2020-0074

Zhou, M. (2022). Understanding preservice teachers' intention to use AI-powered teaching tools: UTAUT2. *Computers & Education: Artificial Intelligence*, *3*. https://doi.org/10.1016/j.caeai.2022.100068