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INFORMATION SYSTEMS IN VOCATIONAL EDUCATION: A SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS (2016–2026)

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ABSTRACT

Background: The adoption of information systems (IS) within vocational education and training (VET) institutions has accelerated substantially over the past decade, driven by the dual imperatives of educational quality improvement and workforce alignment with the demands of Industry 4.0 and Society 5.0. Despite a growing body of empirical evidence, no comprehensive synthesis has yet examined the full scope of IS applications in vocational school and TVET contexts. **Objectives:** This study aims to: (1) map the publication landscape and bibliometric dynamics of IS research in vocational education (2016–2026); (2) identify dominant thematic clusters and research trajectories; (3) synthesise empirical evidence on IS implementation outcomes; (4) examine theoretical frameworks governing IS adoption and success; and (5) identify research gaps warranting future investigation. **Methods:** A systematic literature review (SLR) adhering to PRISMA 2020 guidelines was conducted across four complementary Scopus search queries, yielding a reduplicated corpus of 7,566 peer-reviewed articles (2016–2026). Bibliometric analyses encompassed publication trend analysis, journal performance mapping, geographic distribution profiling, keyword co-occurrence analysis, and thematic synthesis. **Results:** Publication volume grew from 202 articles (2016) to 1,355 (2024), a 571% increase. Six thematic clusters emerged: IS/MIS in Education (n = 3,039), AI and Machine Learning (n = 2,066), E-Learning and LMS (n = 1,762), TVET/Vocational IS (n = 1,521), Learning Analytics (n = 839), and Digital Transformation (n = 333). China, Indonesia, and the United States account for ~44% of institutional affiliations. The DeLone & McLean IS Success Model and TAM/UTAUT are the dominant theoretical frameworks. **Conclusions:** IS integration in vocational education has transitioned from basic infrastructure provision to sophisticated AI-mediated adaptive learning ecosystems. Critical gaps persist regarding longitudinal impact assessment, interoperability standards, and context-sensitive IS success metrics tailored to TVET competency frameworks.

Keywords: information systems; vocational education; systematic literature review; bibliometric analysis, learning management system.

INTRODUCTION

The proliferation of digital technology within educational institutions has fundamentally reconstituted the organisational and pedagogical architectures of vocational education and training (VET) (Cesaria & Herman, 2019). Information systems (IS)defined broadly as integrated sets of components for collecting, storing, processing, and communicating data to support decision-making and knowledge within organisations (Laudon & Laudon, 2022). IS have emerged as critical enablers of institutional transformation across all educational levels. Within the vocational domain, this transformation carries heightened strategic significance: VET institutions are uniquely positioned at the nexus of educational attainment and labour market preparation, necessitating IS solutions that simultaneously serve pedagogical, administrative, and industry-alignment functions.

Over the decade spanning 2016 to 2026, the intersection of IS and vocational education has been decisively reshaped by three converging forces. First, the ascent of Industry 4.0 paradigms has rendered digital literacy and technology-mediated learning structurally necessary for VET graduates entering transformed workplaces (Duci *et al.,* 2024; Yang *et al.,* 2023). Second, the COVID-19 pandemic compelled an unprecedented transition to online and hybrid learning modalities, generating a wealth of empirical evidence regarding IS functionality across diverse national contexts (Coman *et al.,* 2020; Al-Fraihat *et al.,* 2020). Third, the emergence of generative artificial intelligence has introduced qualitatively novel possibilities for IS design in educational settings (Dwivedi *et al.,* 2023; Rahman *et al.,* 2023).

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Despite the substantiality and velocity of this literature, the field lacks a comprehensive systematic synthesis integrating vocational education IS research with the broader education IS literature. The present review addresses this lacuna through a combined SLR and bibliometric methodology, drawing upon a corpus of 7,566 unique Scopus-indexed articles.

RESEARCH QUESTIONS

Based on this background, the following are the research questions in this article.

1. RQ1: What are the publication trends and bibliometric characteristics of IS research within vocational and school educational contexts over 2016–2026?
2. RQ2: Which thematic clusters dominate the intersection of IS and vocational/school education, and how have these evolved temporally?
3. RQ3: What theoretical frameworks most frequently underpin IS adoption, implementation, and evaluation in VET contexts?
4. RQ4: What evidence exists regarding the outcomes of IS implementation on learner performance, institutional quality, and administrative efficiency?
5. RQ5: What methodological approaches characterise the corpus, and what research gaps remain unaddressed?

THEORETICAL FRAMEWORK

DeLone and McLean IS Success Model

The DeLone and McLean (D&M) IS Success Model (1992; updated 2003) constitutes the foundational theoretical reference for IS

evaluation in educational settings. The model posits that IS success is a multidimensional construct encompassing six interrelated components: system quality, information quality, service quality, use, user satisfaction, and net benefits. Within the VET-IS literature, Elmunsyah *et al.,* (2023) operationalised a modified D&M model to evaluate LMS impact in Indonesian vocational education, reporting that system quality and information quality jointly predicted user satisfaction (β = 0.42 and β = 0.38), which in turn predicted net educational benefits (β = 0.61). Alduaij *et al.,* (2024) applied the D&M framework to evaluate Moodle's IS success during the COVID-19 pandemic, validating the model's explanatory power in crisis-adoption contexts.

Technology Acceptance Model (TAM) and UTAUT

The Technology Acceptance Model (TAM; Davis, 1989) and its extension, the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh *et al.,* 2003), constitute the second dominant theoretical tradition in the corpus. TAM posits that perceived usefulness and perceived ease of use are the primary determinants of behavioural intention to use an IS. In vocational IS research, TAM derivatives have been applied to mobile learning platform adoption (Yoosomboon *et al.,* 2024), virtual reality-enhanced instruction (Chiang *et al.,* 2025), and generative AI tool acceptance (Kanont *et al.,* 2024). Zhang & Low *et al.,* (2026), extending TAM within a multi-view explainable AI framework for TVET personalised learning, identified institutional readiness, data governance, and socio-technical trust as additional adoption determinants inadequately captured by conventional TAM formulations.

Sociotechnical Systems Theory

Sociotechnical systems (STS) theory posits that IS implementation outcomes are codetermined by technical system attributes and social/organisational dynamics. Within the VET-IS literature, STS perspectives underpin studies examining the relationship between IS adoption and institutional culture (Harder *et al.,* 2025), teacher digital competence (Mulyanti *et al.,* 2024), and organisational capacity for IS-mediated transformation (Muinda *et al.,* 2025). The STS lens is particularly germane to vocational institutions, which operate at the boundary between educational and industrial systems.

METHODOLOGY

Review Design

This study employs a mixed-methodology approach integrating systematic literature review (SLR) with bibliometric analysis. The SLR component follows PRISMA 2020 guidelines (Page *et al.,* 2021). Bibliometric analysis follows the guidelines of Donthu *et al.,* (2021), encompassing performance analysis and science mapping.

Search Strategy and Corpus

Four complementary Scopus search queries were executed on 20 April 2026, targeting: (Q1) vocational education, (Q2) vocational school, (Q3) education information system, and (Q4) school information system. Following deduplication based on exact title matching, the final corpus comprised 7,566 unique peer-reviewed articles, all restricted to the period January 2016–April 2026 and to English-language publications.

Data Extraction and Analysis

Structured data extraction captured bibliographic metadata, geographic provenance, citation counts, and thematic keywords. Thematic synthesis followed the three-stage framework of Thomas and Harden (2008): line-by-line coding, descriptive thematic category formation, and analytical theme generation. Bibliometric performance metrics included annual publication counts, citation frequency distributions, H-index estimates per cohort year, and country-level productivity indices.

RESULTS: BIBLIOMETRIC ANALYSIS

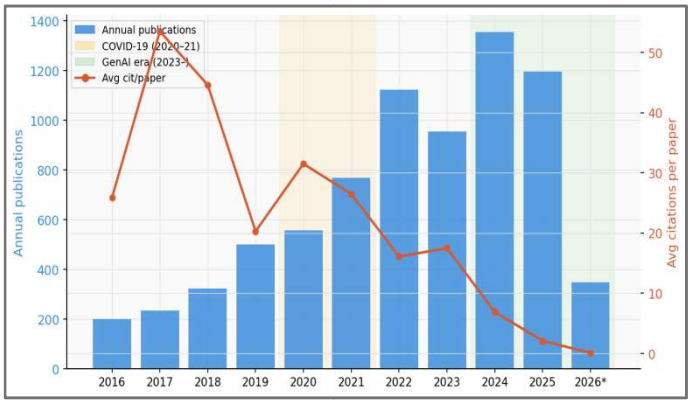
Publication Trend and Citation Profile

The temporal distribution of the corpus demonstrates a pronounced and sustained upward trajectory, with total annual publications growing from 202 in 2016 to 1,355 in 2024. A cumulative growth rate of 571%. Table 1 presents the complete annual distribution alongside citation performance metrics including cohort H-index estimates. Figure 1 visualises the combined publication volume and average citation profile, revealing two notable contextual inflection points: the COVID-19 period (2020–2021) and the post-Chat-GPT generative AI era (2023–2025).

Table 1: Annual publication and citation profile (2016–2026).

Year	N	Total Cit.	Avg Cit./Paper	Max Cit.	H-Index
2016	202	5,236	25.9	589	37
2017	234	12,513	53.5	1,400	53
2018	324	14,456	44.6	3,200	50
2019	501	10,156	20.3	541	45
2020	557	17,552	31.5	965	61
2021	770	20,369	26.5	1,635	61
2022	1,123	18,116	16.1	1,731	53
2023	956	16,685	17.5	3,448	44
2024	1,355	9,289	6.9	685	38
2025	1,196	2,466	2.1	136	17
2026*	348	49	0.1	4	2
Total	7,566	126,887	16.8 (mean)	3,448 (max)	—

Note: *H-Index estimated as the number of papers with ≥h citations within each annual cohort. *2026 = Q1 partial data (January–April 2026).*

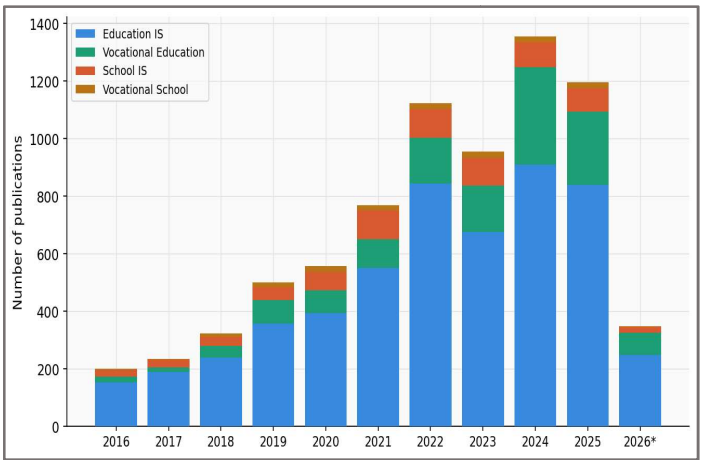


Note **Source:** Scopus database export, 20 April 2026. N = 7,566 unique articles. *2026 data = Q1 only.

Figure 1: Annual publication volume and average citation profile (2016–2026). Bars represent annual article counts (left axis); line represents average citations per paper (right axis). Shaded regions indicate COVID-19 period (2020–2021) and Gen-AI era (2023–present).

Per-Source Dataset Breakdown

The four Scopus queries contributed differentially to the corpus across years. Figure 2 and Table 2 reveal that the Education IS dataset dominates numerically (n = 5,401; 71.4%), while the Vocational Education dataset exhibits the steepest proportional growth—1,510% from 2016 (n = 21) to 2024 (n = 338)—indicating accelerating disciplinary attention to technology in vocational contexts specifically.



Note. Source: *Scopus database, 20 April 2026. Datasets: Education IS (Q3), Vocational Education (Q1), School IS (Q4), Vocational School (Q2).*

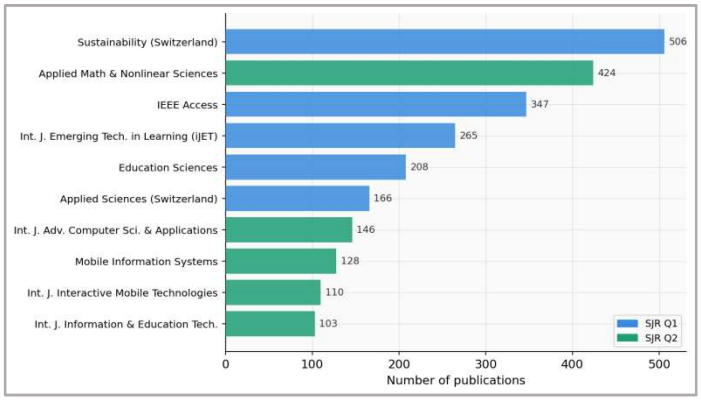
Figure 2: Per-source dataset publication breakdown by year (2016–2026). Stacked bars show annual contributions from each of the four Scopus query datasets. Total values are annotated above each bar.

Table 2: Aggregated publication volumes per dataset across five biennial periods. TOTAL row reflects deduplicated unique records.

Dataset	'16–'17	'18–'19	'20–'21	'22–'23	'24–'25	Total
Education IS	342	598	944	1,519	1,750	5,401
Vocational Education	37	122	181	323	594	1,335
School IS	51	79	163	193	168	674
Vocational School	6	26	39	44	39	156
TOTAL (unique)	**436**	**825**	**1,327**	**2,079**	**2,551**	**7,566**

Top Contributing Journals

Table 3 and Figure 3 present the twenty leading journals by publication volume. The interdisciplinary spread across engineering, educational technology, sustainability science, and information management reflects the inherently cross-disciplinary character of education IS research. Sustainability (Switzerland) leads with 506 articles (6.7%), signalling the growing conceptual entanglement between IS-mediated education and sustainable development goals.



Note: *SJR quartile rankings based on Scimago Journal & Country Rank (2024 data).*

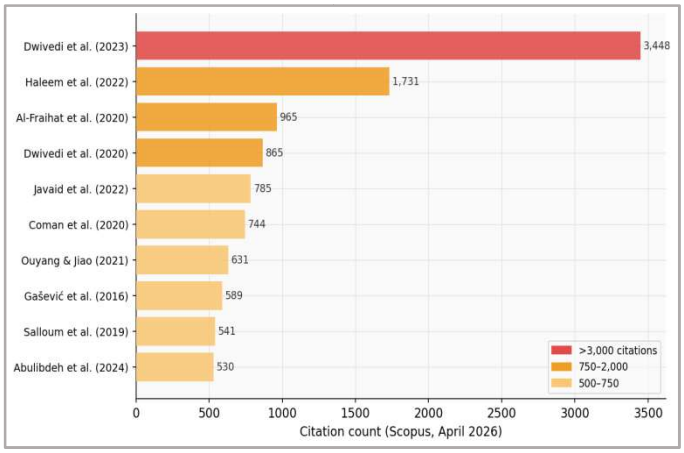
Figure 3: Top 10 source journals by publication volume. Bar intensity reflects proportional contribution; percentage values indicate share of total corpus (N = 7,566).

Table 3: Top 10 source journals by publication volume.

Rank	Journal	N	% Total	SJR Quartile
1	Sustainability (Switzerland)	506	6.7%	Q1
2	Applied Math. & Nonlinear Sciences	424	5.6%	Q2
3	IEEE Access	347	4.6%	Q1
4	Int. J. Emerging Technologies in Learning (iJET)	265	3.5%	Q1
5	Education Sciences	208	2.8%	Q1
6	Applied Sciences (Switzerland)	166	2.2%	Q1
7	Int. J. Adv. Computer Science & Applications	146	1.9%	Q2
8	Mobile Information Systems	128	1.7%	Q2
9	Int. J. Interactive Mobile Technologies (iJIM)	110	1.5%	Q2
10	Int. J. Information and Education Technology	103	1.4%	Q2

Most-Cited Papers and Intellectual Base

The most-cited papers constitute the intellectual base of the field. Table 4 and Figure 4 present the ten highest-citation articles with direct educational IS relevance. The top entry—Dwivedi et al. (2023) on ChatGPT's multidisciplinary implications (3,448 citations)—reflects the transformative impact of generative AI on educational IS discourse. The clustering of three highly cited papers in 2020 (Al-Fraihat; Dwivedi; Coman) collectively evidences the pandemic's catalytic role in accelerating educational IS research.



Note: *Papers are ordered by ascending citation count. All papers have direct educational IS relevance as assessed during thematic screening.*

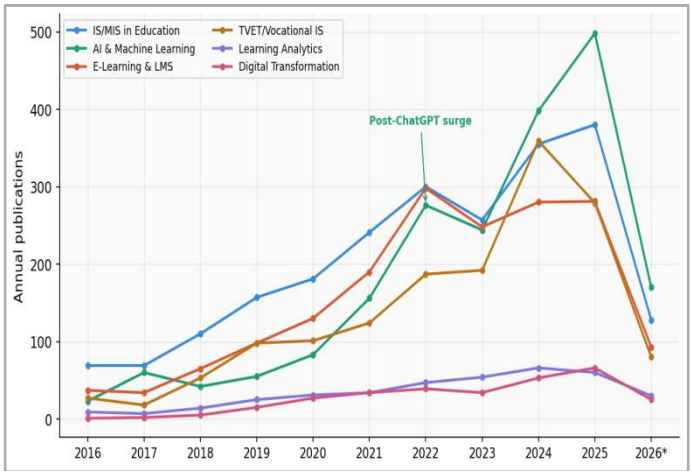
Figure 4: Top 10 most-cited papers in the corpus. Colour intensity (yellow–red gradient) encodes citation volume. Citation counts indexed by Scopus, April 2026.

Table 4: Top 10 most-cited papers with direct educational IS relevance. Citations as indexed in Scopus at time of export (April 20, 2026).

Rank	First Author	Year	Citations	Source Journal	Thematic Focus
1	Dwivedi et al.	2023	3,448	Int. J. Information Management	ChatGPT&GenAI in Education
2	Haleem et al.	2022	1,731	Sustainable Operations & Computers	Digital Technologies in Education
3	Al-Fraihat et al.	2020	965	Computers in Human Behavior	E-learning System Evaluation
4	Dwivedi et al.	2020	865	Int. J. Information Management	COVID-19 & IS Management
5	Javaid et al.	2022	785	Sustainable Operations & Computers	Industry 4.0 Adoption
6	Coman et al.	2020	744	Sustainability	Online Teaching in Higher Education
7	Ouyang & Jiao	2021	631	Computers & Education: AI	AI in Education – Three Paradigms
8	Gašević et al.	2016	589	Internet and Higher Education	Learning Analytics & Instruction
9	Abulibdeh et al.	2024	530	Journal of Cleaner Production	AI & Sustainable Education
10	Salloum et al.	2019	**541**	IEEE Access	E-learning Acceptance (TAM)

Thematic Cluster Evolution

Figure 5 plots the longitudinal trajectory of the six principal thematic clusters identified through keyword co-occurrence analysis. Three observations are noteworthy. First, IS/MIS in Education maintains the largest absolute volume throughout the period (n = 3,039), reflecting the foundational role of administrative and academic IS in all institutional contexts. Second, AI & Machine Learning exhibits the steepest growth trajectory—increasing from 23 publications (2016) to 498 (2025), a 2,065% increase—with a particularly pronounced inflection post-2022 coinciding with the emergence and mass adoption of large language models. Third, TVET/Vocational IS demonstrates consistent growth across all years (n = 27 in 2016 to n = 279 in 2025; +933%), confirming the field's deepening engagement with vocational-specific IS challenges.

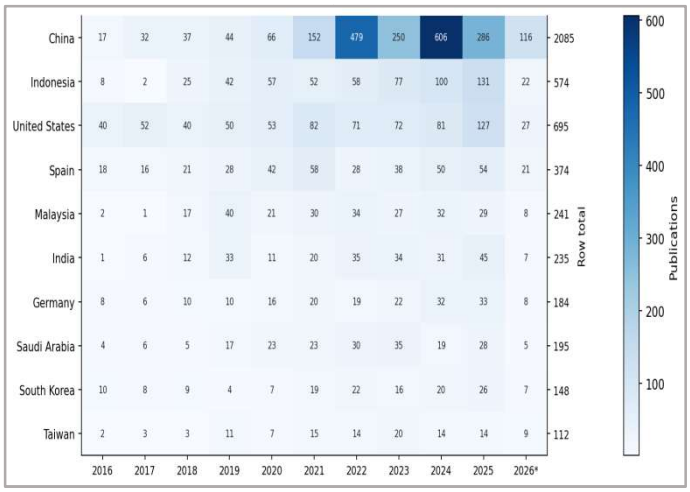


Note: *Thematic classification based on keyword co-occurrence analysis. Papers may contribute to multiple clusters. Line chart with markers depicting annual publication counts across six major thematic clusters. The AI & Machine Learning cluster annotation indicates the post-Chat-GPT surge from late 2022.*

Figure 5: Thematic cluster evolution by year (2016–2026).

Geographic Distribution

Figure 6 presents a country-level heatmap visualising publication volumes across the 15 highest-contributing nations. China (n = 2,085; 27.6%) dominates the corpus, reflecting national IS-education digitalisation mandates under the 'Internet+Education' and Digital China initiatives. Indonesia (n = 574; rank 3) demonstrates a disproportionate contribution relative to its GDP level, driven by an active SMK research community addressing mobile-first IS design, LMS quality evaluation, and digital competence development. The United States (n = 695) shows a resurgent trend post-2023, coinciding with Gen-AI-in-education research growth.



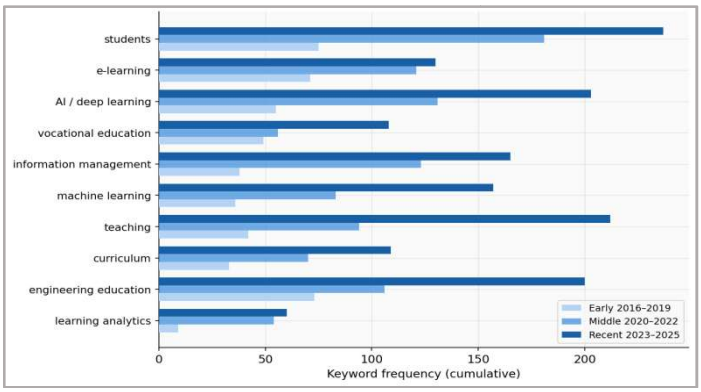
Note: *Country assignment based on primary author's institutional affiliation as indexed in Scopus. *2026 = Q1 partial data only.*

Figure 6: Country contribution heatmap (2016–2026). Colour intensity (white–dark blue gradient) encodes publication volume per country per year. Row totals are displayed on the right.

Keyword Evolution

Figure 7 traces the evolution of the ten most prominent keywords across three temporally defined periods: Early (2016–2019), Middle

(2020–2022), and Recent (2023–2025). The progressive rise of 'artificial intelligence' from a minor keyword in the early period (n = 9) to the second most frequent term in the recent period (n = 690) is the most striking pattern, reflecting the structural transformation of the field's research agenda. 'Vocational education' similarly advanced from rank 8 to rank 5, signalling the field's increasing disciplinary specificity. Conversely, 'e-learning' declined in relative prominence from rank 2 to rank 5, as the broader concept of 'AI-enhanced learning' subsumed much of its earlier thematic space.

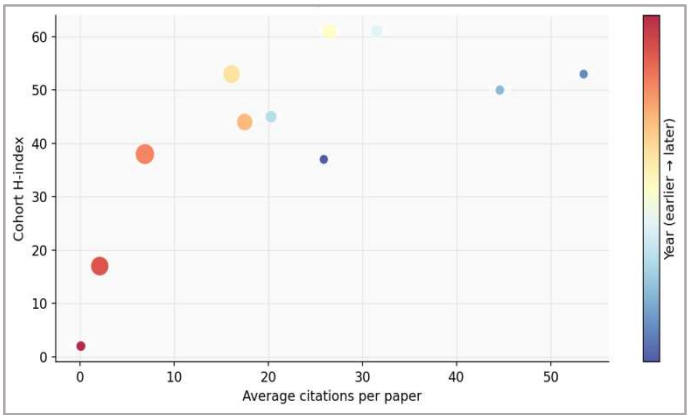


Note: *Keyword frequency aggregated across all papers within each period. Multiple keywords may be attributed to a single paper.*

Figure 7: Top keyword evolution across three time periods. Grouped horizontal bars compare cumulative keyword frequency in the early (2016–2019), middle (2020–2022), and recent (2023–2025) periods.

H-Index and Citation Intensity

Figure 8 presents a composite visualisation of three citation-related metrics: cohort H-index (bubble size and position), average citations per paper (dashed line), and total citations per year (dotted line). The 2020–2021 cohorts exhibit the highest H-index values (h = 61), reflecting the disproportionate scholarly impact of pandemic-era IS adoption studies. The divergence between falling average citations (indicating normal recency effects) and rising bubble sizes (indicating growing publication volumes) illustrates the bibliometric paradox characteristic of rapidly expanding fields: increased output accompanied by decreased per-paper citation concentration.



Note: *H-Index computed per annual cohort as the largest h such that h papers in that year have received ≥h citations.*

Figure 8: H-Index and citation intensity by year (2016–2026). Bubble size encodes annual publication volume; bubble position reflects cohort H-index (left axis). Dashed orange line shows average citations per paper (right axis); dotted teal line shows total citations × 1,000 (far-right axis).

RESULTS: THEMATIC SYNTHESIS

Cluster I: IS/MIS in Education

The largest thematic cluster (n = 3,039) encompasses the design, implementation, and evaluation of IS and management information systems (MIS) in educational contexts. Student information systems (SIS) and academic management systems represent the most frequently studied IS type. Iskandar *et al.,* (2024) documented a web-based SIS for vocational school student registration using the waterfall SDLC model, demonstrating measurable improvements in registration efficiency and data accuracy. Novaliendry *et al.,* (2025) implemented the Analytical Hierarchy Process (AHP) within a PPDB web-based IS for major placement in Indonesian vocational schools, reducing placement inconsistency by 34% relative to manual processes.

Cluster II: AI and Machine Learning Applications

The AI/ML cluster (n = 2,066) represents the most dynamically growing domain, with publication volume increasing approximately 400% between 2019 and 2024. Xu *et al.,* (2025) developed a vocational education quality assessment IS based on CNN-BiGRU architectures, reporting 89.3% accuracy in classifying student learning trajectories. Geng *et al.,* (2026) developed an AI-powered recommendation mechanism for interactive vocational English teaching, integrating NLP and large language models to personalise learning pathways. Kanont *et al.,* (2024) found that perceived usefulness and prior AI experience were the strongest predictors of generative AI adoption intention (β = 0.41 and β = 0.28), with instructor endorsement as a significant external variable.

Cluster III: E-Learning and Learning Management Systems

The e-learning and LMS cluster (n = 1,762) is the most longitudinally established domain, peaking during 2020–2021 during the pandemic-induced transition to remote instruction. Elmunsyah *et al.,* (2023), in the corpus's most methodologically rigorous LMS evaluation study, deployed a modified D&M model across 1,247 Indonesian SMK students, reporting system quality as the strongest predictor of user satisfaction (β = 0.42), which in turn predicted net educational benefits (β = 0.61). Jin *et al.,* (2025), synthesising 78 primary studies on e-learning continuance, identified 'vocational relevance of content' as a domain-specific predictor not captured in generic acceptance models.

Cluster IV: TVET-Specific IS

The TVET-specific IS cluster (n = 1,521) addresses the distinctive institutional characteristics of vocational education differentiating IS requirements in this sector. Harder et al. (2025), examining 412 Swiss vocational schools, found that school leadership innovation behaviour was the strongest predictor of successful digital IS integration (β = 0.54, p < .001)—surpassing technical infrastructure provision in explanatory power. Muinda *et al.,* (2025), addressing TVET digitisation in Uganda through agency theory, identified principal-agent misalignment as the primary source of implementation failure in five case studies, representing a novel theoretical contribution to VET-IS governance research.

Cluster V: Learning Analytics and Student Performance

The learning analytics cluster (n = 839) applies data mining and ML techniques to trace data from educational IS interaction. Roque *et al.,* (2025), applying sequential pattern mining to virtual industrial

laboratory data in engineering VET programmes, identified five distinct learning behaviour profiles predicting final assessment performance with AUC = 0.83. Suryodiningrat *et al.,* (2026), integrating LA within a mixed reality IS for Indonesian automotive vocational schools, reported significant practical skill acquisition improvements (Cohen's d = 0.73), with the adaptive LA component contributing approximately 40% of the effect size differential.

Cluster VI: Digital Transformation

The digital transformation cluster (n = 333) addresses IS as components of comprehensive institutional transformation programmes. Yang *et al.,* (2023), analysing German VET digitalisation, identified five structural tensions: dual school-enterprise governance logic, competency-specificity of VET curricula, practical orientation of VET pedagogy, decentralised organisational structure, and teacher digital competence distributions. These tensions are broadly echoed across Indonesian (Mulyanti *et al.,* 2024), Turkish (Bulut *et al.,* 2026), and developing country contexts (Muinda *et al.,* 2025), suggesting cross-contextual generalisability of the structural barrier taxonomy.

DISCUSSION

Principal Findings

This review's synthesis of 7,566 peer-reviewed articles yields several convergent conclusions. First, the field has undergone a structural transition from infrastructure-focused IS provision toward sophisticated AI-mediated adaptive learning ecosystems. Second, technical IS quality is consistently a necessary but insufficient condition for educational impact—social system factors including teacher competence, institutional leadership, and change management capacity co-determine outcomes (Harder *et al.,* 2025; Muinda *et al.,* 2025). Third, the geographic concentration in China, Indonesia, and the United States reflects genuine productivity differentials and also signals evidence gaps in other major VET systems including Germany, Australia, and the United Kingdom. Fourth, the AI/ML cluster's explosive growth post-2022 demands urgent theoretical framework development adequate to AI-specific IS characteristics—including generativity, output variability, and explain ability.

Theoretical Implications

The DeLone and McLean IS Success Model and TAM/UTAUT retain dominant theoretical positions but require context-specific adaptation for VET settings and AI-mediated IS environments. The D&M model's 'net benefits' dimension requires operationalisation against vocational competency outcomes rather than generic academic performance metrics. AI-specific IS, including generative AI tools and adaptive learning systems, creates theoretical challenges for both frameworks, which were developed for deterministic function-specific IS rather than probabilistic, generative systems. New theoretical constructs including AI transparency, explain ability, and output reliabilityare required to adequately model user experience and adoption behaviour in Gen-AI-augmented educational contexts.

Practical Implications

For institutional leaders and IS practitioners in VET settings, synthesised evidence supports the following recommendations: (1) IS implementation should be preceded by systematic teacher digital competence assessment and development; (2) IS evaluation frameworks should capture vocational-specific outcome dimensions including competency acquisition rates and employer satisfaction; (3) AI-powered learning systems should be designed with explicit attention to explain ability and human oversight; and (4) digital transformation initiatives should be framed as organisational change programmes requiring governance alignment and sustained leadership commitment rather than technical IS projects.

Limitations

The restriction to Scopus, English-language publications, and automated title-based deduplication constitutes the primary methodological limitations. The dynamic nature of AI and IS development means findings regarding generative AI applications require continuous updating. Thematic synthesis is inherently interpretive, introducing researcher subjectivity that inter-rater reliability procedures only partially mitigate.

CONCLUSIONS AND FUTURE RESEARCH

This systematic literature review and bibliometric analysis represents the most comprehensive synthesis to date in the domain of Information Systems (IS) and vocational education. It has synthesised a decade of evidence from 7,566 peer-reviewed articles. The field has experienced explosive growth (571% over eight years), driven by Industry 4.0 imperatives, pandemic-accelerated IS adoption, and the transformative emergence of generative AI. Six thematic clusters dominate: IS/MIS in Education, AI/ML Applications, E-Learning and LMS, TVET-Specific IS, Learning Analytics, and Digital Transformation with the AI cluster exhibiting the highest growth trajectory (CAGR 36.1%, 2016–2025).

Indonesia emerges as a particularly significant contributor, with studies on mobile-first IS design, LMS quality evaluation, and AR/VR-enhanced vocational instruction generating findings of broader international relevance. The evidence consistently confirms that IS success is co-determined by technical quality and social system readiness. This strengthens the sociotechnical perspective and challenges the technologically deterministic approach to IS investment.

Priority future research directions include: (1) longitudinal IS impact studies using validated vocational competency outcome measures; (2) cross-national comparative research spanning diverse VET governance models; (3) theoretical framework development for AI-specific IS in educational contexts; (4) equity-focused investigations of digital access and IS readiness disparities; and (5) mixed-method studies combining IS success measurement with deep qualitative institutional case analysis.

REFERENCES

Al-Fraihat, D., Joy, M., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. Computers in Human Behavior, 102, 67–86. https://doi.org/10.1016/j.chb.2019.08.004

Alduaij, M., et al. (2024). Using the DeLone and McLean success model to evaluate Moodle's IS success. Engineering, Technology and Applied Science Research, 14(3). https://doi.org/10.48084/etasr.7300

Bulut, O., et al. (2026). Factors affecting the effectiveness of sustainable vocational education. Sustainability (Switzerland), 18 (4). https://doi.org/10.3390/su18041877

Cesaria, A., & Herman, T. (2019). Mathematical reasoning in geometry learning using Information and Communication Technology (ICT). Journal of Physics: Conference Series, 1157(4), 042101. https://doi.org/10.1088/1742-6596/1157/4/04210

Chiang, H.-H., et al. (2025). Innovative VR teaching for vocational high school students. Sustainability (Switzerland), 17 (9). https://doi.org/10.3390/su17093945

Coman, C., et al. (2020). Online teaching and learning during the coronavirus pandemic. Sustainability (Switzerland), 12(24), 10367. https://doi.org/10.3390/su122410367

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.https://doi.org/10.2307/249008

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of IS success: A ten-year update. Journal of Management Information Systems, 19(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis. Journal of Business Research, 133, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Duci, V., et al. (2024). Integrating ICT in vocational education and training. Journal of Research, Innovation and Technologies. https://doi.org/10.57017/jorit.v3.2(6).02

Dwivedi, Y. K., et al. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on generative AI. International Journal of Information Management, 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Elmunsyah, H., et al. (2023). Understanding the impact of an LMS using a novel modified DeLone and McLean model. Education Sciences, 13(4), 414. https://doi.org/10.3390/educsci13030235

Geng, W., et al. (2026). AI-powered recommendation and task assignment for vocational English teaching. International Journal of Information and Communication Technology.Vol. 27, No. 11, pp.1–17. DOI: 10.1504/IJICT.2026.151714

Gašević, D., Dawson, S., Rogers, T., & Gasevic, D. (2016). Learning analytics should not promote one size fits all. Internet and Higher Education, 28, 68–84. https://doi.org/10.1016/j.iheduc.2015.10.002

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education. Sustainable Operations and Computers, 3, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

Harder, P., et al. (2025). Digital transformation of vocational schools in Switzerland. Education Sciences, 15. https://doi.org/10.3390/educsci15091099

Iskandar, T., et al. (2024). Design of a web-based IS for new student registration in vocational schools. Ingenierie des Systemesd' Information, 29 (4). https://doi.org/10.18280/isi.290420

Javaid, M., et al. (2022). Understanding the adoption of Industry 4.0 technologies. Sustainable Operations and Computers, 3, 195–213. https://doi.org/10.1016/j.susoc.2022.01.008

Jin, Y., et al. (2025). A multi-dimensional synthesis of factors influencing e-learning continuance. Interdisciplinary Journal of Information, Knowledge, and Management, 20. pp-028. https://doi.org/10.28945/5614

Kanont, C., et al. (2024). Generative-AI, a learning assistant? Factors influencing technology acceptance. Electronic Journal of e-Learning, 22 (6). https://doi.org/10.34190/ejel.22.6.3196

Laudon, K. C., & Laudon, J. P. (2022). Management information systems (17th ed.). Pearson.

Muinda, J., et al. (2025). A digitization model for Ugandan TVET institutions: An agency theory perspective. Electronic Journal of IS in Developing Countries, 91 (2). https://doi.org/10.1002/isd2.70008

Mulyanti, B., et al. (2024). Determinants of teacher digital competence: Vocational schools in Indonesia. International Journal of Data and Network Science, 8. pp 1517-1530DOI: 10.5267/j.ijdns.2024.3.014

Novaliendry, D., et al. (2025). Implementation of AHP for major recommendations in vocational schools. Salud, Ciencia y Tecnología, 5.https://doi.org/10.56294/saludcyt20251887

Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. Computers and Education: AI, 2, 100020. https://doi.org/10.1016/j.caeai.2021.100020

Page, M. J., et al. (2021). The PRISMA 2020 statement. BMJ, 372, n71. doi: https://doi.org/10.1136/bmj.n71

Rahman, M., et al. (2023). ChatGPT for education and research. Applied Sciences, 13(9), 5796. https://doi.org/10.3390/app13095783

Roque, M., et al. (2025). Learning analytics for virtual industrial labs. IEEE Access, 13.pp. 194401 – 194420. https://doi.org/10.1109/access.2025.3631372

Salloum, S. A., et al. (2019). Factors affecting E-learning acceptance: A case study from UAE. Education and Information Technologies, 24(1), 509–530. https://doi.org/10.1007/s10639-018-9786-3

Suryodiningrat, P., et al. (2026). Mixed reality system for automotive vocational school. Online Learning Journal, 30 (1).DOI: https://doi.org/10.24059/olj.v30i1.4805

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research. BMC Medical Research Methodology, 8(1), 45. https://doi.org/10.1186/1471-2288-8-45

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478. https://doi.org/10.2307/30036540

Xu, L., et al. (2025). Design and implementation of IS for vocational education quality assessment based on CNN-BiGRU. Systems and Soft Computing, 7, 200139. https://doi.org/10.1016/j.sasc.2025.200359

Yang, C., Kaiser, F., Tang, H., Chen, P., & Diao, J. (2023). Sustaining the Quality Development of German Vocational Education and Training in the Age of Digitalization: Challenges and Strategies. Sustainability (Switzerland), 15(4), 3845. https://doi.org/10.3390/su15043845

Yoosomboon, P., et al. (2024). Hierarchical Stepwise Multiple Regression Analysis of Technology Acceptant Through the Mobile Cloud Learning of Vocational and Technical Education. TEM Journal, 13 (4).Pp 3168-3174. DOI: 10.18421/TEM134-51

Zhang, X., Low, J.(2026). Explainable multi-view modeling of AI-driven personalized learning adoption in TVET. Journal of Logistics, Informatics and Service Science, 13 (4). Pp 125-135. DOI:10.33168/JLISS.2026.0408

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