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TABLE of CONTENTS

FORECASTING THE MALAYSIAN RINGGIT (MYR) EXCHANGE RATE: ARIMA VS GARCH Rabi'atul Adawiyah Muhamad Shah & Nurul Nisa' Khairol Azmi*	1 - 16
BEHIND THE SCREEN: A SYSTEMATIC REVIEW OF CONTEMPORARY CHALLENGES IN DIGITAL LEARNING Siti Noorsiah Jamaludin ¹ , Abd Samad Hasan Basari ²	17 - 36
INVESTIGATING THE EFFECTIVENESS OF COLLABORATIVE LEARNING STRATEGIES IN MASTERING THE ARABIC LANGUAGE Abd Rahman Jamaan*	37 - 52
IMPLEMENTING CLAY SCULPTING AS AN IDEATION STRATEGY IN TEACHING PRODUCT FORM DESIGN TO FIRST-YEAR INDUSTRIAL DESIGN STUDENTS Mohd Hamidi Adha Mohd Amin ¹	53 - 68
EXPLAINING ENTREPRENEURIAL INTENTION OF MALAYSIAN PUBLIC UNIVERSITY STUDENTS: THE MEDIATION MODERATED MODEL Ahmad Nabil Mohd Zahariman ¹ , Nur Fatin Syazliana Zahar ² , Nurul Hidayana Mohd Noor ^{3*} & Syeliya Md Zaini ⁴	69 - 88
SUPPLIER SELECTION OF HALAL KOREAN RESTAURANT USING FUZZY TOPSIS Norpah Mahat ¹ , Nurul Aqilah Ahmad ²	89 - 102
RAINFALL INTENSITY CLASSIFICATION IN SUBANG Mohamad Aiman Hakim Mohamad Nizam ¹ , Isnewati Ab Malek ^{2*} & Jaida Najihah Jamidin ³	103 - 116
SYNCHRONOUS AND ASYNCHRONOUS CORRECTIVE FEEDBACK FOR GRAMMAR ACCURACY: ESL NOVICE TEACHERS' BELIEFS AND PRACTICES Aiman Zulaikha Mohd Fadzli ¹ , Sheela Faizura Nik Fauzi ^{2*} & Abdul Azim Mahda ³	117 - 130
DIGITAL SPORTS GRAPHICS AND BRAND PERSONALITY IN THE MALAYSIAN SEPAK TAKRAW LEAGUE Muhammad Asyraf Hanafi ¹ , Neesa Ameera Mohamed Salim ^{2*} & Azhar Abd Jamil ³	131 - 142
TOWARDS INCLUSIVE GAMIFIED LITERACY INTERFACES FOR MALAYSIAN STUDENTS WITH DYSLEXIA: INTEGRATING THE DELONE AND MCLEAN INFORMATION SYSTEMS SUCCESS MODEL Safura Adeela Sukiman ^{1*}	143 - 163
UNDERSTANDING RECYCLING BEHAVIOR: A STUDY ON UITM SEGAMAT STUDENTS Nur Diana Zaman ¹ , Fatin Farazh Ya'acob ^{2*} , Basri Badyalina ¹ , Muhammad Zulqarnain Hakim Bin Abd Jalal ¹ , Amir Imran Zainoddin ² & Kerk Lee Chang ¹	164 - 176
DOES FDI BENEFIT ALL? EXAMINING INCOME INEQUALITY ACROSS 10 ASEAN NATIONS Bee-Hoong Tay ^{1*} , Nurulrahwani Hamsan ² , Nurul Dhihani Md Idris ³ & Nurul Hafiizzati M Roslee ⁴	177 - 190
MESOPOTAMIAN ARCHITECTURE AS BACKGROUND DESIGN IN CONTEMPORARY ANIMATED SERIES Nureen Qistina Affandi ¹ , Siti Nur Ain Abd Rahman ^{2*}	191 - 209

TRANSFORMING HRM EDUCATION THROUGH VALUES-BASED PEDAGOGY: THE ADAB+ APPROACH AND CORPORATE RELEVANCE	210 - 224
Muhammad Aiman Awalluddin ^{1*} , Anisa Safiah Maznorbalia ² & Mohd Ramlan Mohd Arshad ³	
COMPARATIVE ANALYSIS OF PSEUDOCODE AND FLOWCHARTS IN ALGORITHM DEVELOPMENT AMONG FIRST-YEAR COMPUTER SCIENCE STUDENTS	225 - 239
Satria Arjuna bin Julaihi ¹ , Zubaidah binti Bohari ^{2*} , Rumaizah binti Che Md Nor ³ & Abdul Hadi bin Abdul Talip ⁴	
EXPLORING THE STUDENT PERCEPTION OF ACRONYM-BASED LEARNING APPROACH IN LEARNING ACCOUNTING PRINCIPLES AMONG NON-ACCOUNTING MAJOR STUDENTS	240 - 258
Siti Aimi Mohamad Yasin ¹ , Corina Joseph ^{2*} & Nur Izyan Ismail ³ , Nuraisyah Fitrie Abdullah@Abd Jalil ⁴ , Azmira Abdullah ⁵	
ZAKAT DISTRIBUTION DECISION BASED ON FUZZY EVALUATION APPROACH	259 - 272
Zamali Tarmudi ¹ , Noor Syazana Ngarisan ^{2*} & Muhammad Yassar Yusri ³	
LEAN PRACTICES IN CONSTRUCTION: A COMPREHENSIVE LITERATURE REVIEW ON ENHANCING PROJECT PERFORMANCE	273 - 284
Syed Nasrul Fadzli Syed Mohamad ^{1*} , Mohd Shahnaz Bin Mahbook Ali ² & Amir Ahzlina Jasni ³	

BEHIND THE SCREEN: A SYSTEMATIC REVIEW OF CONTEMPORARY CHALLENGES IN DIGITAL LEARNING

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ABSTRACT

This study investigates the critical role of digital learning as a key advancement in education aimed at improving quality through digitization. As digital platforms and technologies become increasingly integral across educational contexts, various challenges have emerged during this transition. The paper systematically reviews existing research on the issues faced by the education sector in implementing digital learning, aiming to provide a foundational understanding that can guide future studies. Using the SALSA framework, the review analyzes vocabulary related to these challenges within relevant articles. Databases including Science Direct, Scopus, and Web of Science were searched for publications from January 2018 to July 2025, applying specific keywords and inclusion criteria. Out of the search, 26 publications meeting the eligibility requirements were selected and examined to answer the research questions. The review offers a concise summary of the latest developments concerning challenges in digital learning within education.

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1. Introduction

Digital learning in education has grown tremendously in recent years as a new demand in educational environments. With the growth of the technology ecosystem, education must be digitally collaborative and interactive to support digital education as a new revolution in education experiences. According to Balyer & Öz (2018), various digital technology improvements create the possibility of integrating digital education between students and

educators as new elements of our age. It consists of a wide range of technologies (such as big data, cloud systems, integrative platforms, and predictive analytics) that allow the collaboration and communication of technologies to change and develop the new landscape of education (Jackson, 2019). Integrating information technologies and communication has provided valuable learning resources that broaden education by generating online education spaces and activities (Peñarrubia-Lozano et al., 2021). Digital learning is an approach to reforming educational institutions to facilitate various technologies and pedagogical practices in teaching-learning activities (Røe et al., 2022). Thus, the integration of information and technology ecosystems has strengthened digital learning, challenging traditional education to adapt to the new learning era. This transition has also included dialogue among educational leaders playing a vital role in transforming the landscape of education to digital learning in phases swiftly (Jackson, 2019). However, it was emphasized by Iflahen et al. (2024) that the transition highlighted the importance of adopting digital platforms while encouraging a mindful reassessment of teaching methodologies to meet the needs of a predominantly online learning environment effectively. Although COVID-19 has rapidly shifted education towards digital methods, the lack of direct comparisons in recent literature regarding its impact makes it difficult to predict long-term consequences (Iflahen et al., 2024). This highlights the essential need for ongoing research in public education. Therefore, building a strong digital infrastructure and fostering a culture of digital connectivity among educators and students are essential steps toward realizing the potential of digital learning and harnessing the capabilities of the latest technologies. It is important to acknowledge that the contemporary higher education system requires adaptation to remain in alignment with technological advancements.

This paper aims to present an in-depth view of digital learning environments through an assessment of the literature that demonstrates the significant work in the field and identifies the issues to streamline future investigation. Reviewing the related literature is necessary to map and assess the existing knowledge to develop a further knowledge base and identify gaps in the specific topic (Mengist et al., 2020b). In order to ensure these studies are not biased, the literature review should critically evaluate previous research studies that address issues in digital learning and be developed based on a well-defined structure of systematic literature. According to Cavalcanti et al. (2021), a well-defined structure is required for a literature review to ensure that the results are not skewed and that relevant studies that target a particular subject are critically evaluated. In this study context, a systematic review of the literature is conducted based on the Search, Appraisal, Synthesis, and Analysis (SALSA) framework. Thus, this paper offers a systematic review of previous publications within digital learning by highlighting the issues, demonstrating the results and discussion, concluding the study, and recommending future work.

2. Literature Review

Generally, the COVID-19 pandemic has forced the adoption of digital learning, resulting in a steep technological learning curve in global education (Røe et al., 2022). The sudden shift from the traditional face-to-face classroom setting to digital learning has dramatically reshaped the way global education is delivered due to the COVID-19 outbreak (El Said, 2021), which immediately forced the closure of schools, colleges, and universities as a measure of confinement and containment to curb its spread (Watermeyer et al., 2021). However, this unprecedented situation emerges as a challenge in the education sector to ensure that technology's rapid growth can be utilized in the education environment by leveraging digital technology to implement teaching and learning.

Despite the advantages of digital education, there are some challenges for educational institutions to deal with. Among these are challenges in effectively maintaining consistent

communication between academic staff and students in the digital adaptation (Iflahen et al., 2024). Notably, educational institutions struggle to adapt to digital learning. It is emphasized by livari et al. (2020) that various digital gaps are forming and widening, as well as issues that may have been encountered. Thus, it is essential for educational programs to align with real-world applications (Mun et al., 2023). This alignment should ensure that the curriculum is relevant and fosters the practical application of concepts related to digital transformation while also meeting the necessary competency requirements.

Meanwhile, digital learning has recently attracted and received incredible attention (Kang, 2021) and has grown tremendously as an alternative to the face-to-face classroom (Cavalcanti et al., 2021; Iflahen et al., 2024). One of the factors of this growth is the COVID-19 pandemic that has struck all over the world and marked everything globally, in addition to the growing sophistication of technological capabilities. Although technology solutions to support teaching and learning have been implemented over the past few years, the immediate transition of digital learning in the education environment has now been realized as a new strategy to leverage opportunities for digital education approaches. As livari et al. (2020) mentioned, digital learning is required in the future to address the needs of the new generation and their digitalization. On the other hand, COVID-19 has given educational institutions little alternative but to move to digitalization immediately (Banhegyi & Fajt, 2022). This situation has compelled educational institutions to embrace technological and digital solutions quickly to uphold their educational responsibilities (Iflahen et al., 2024). This transformation has a profound impact on all economic, social, and societal systems and has even triggered drastic changes in the education sector, prompting numerous issues in effectively integrating digital technology into the educational environment.

Even though the digital transformation brought innovation and solutions to educational institutions, it put much pressure on the implementation (Pham et al., 2021). Its implementation is also highly questionable regarding sustainable development and triggers various issues (Arnold et al., 2021). From an educator's perspective, it is revealed that several digital learning issues (such as digital tools, pedagogy, and digital infrastructure) elicit both positive and negative emotions (Alwafi, 2021). From a student's standpoint, learning is more dependent on oneself, which is concerned with learning skills and adaptation to new learning settings (Banhegyi & Fajt, 2022). Research has shown that online teaching adversely affects students' learning experiences (Domingues et al., 2023). In addition, the organization also considers cultural and managerial resistance an obstacle to implementing digital learning (Alhubaishy & Aljuhani, 2021). Thus, engaging in ongoing dialogue with stakeholders for educational digital learning is essential for its comprehensive implementation.

The ongoing digital learning is compelling universities to adopt technological and digital solutions to fulfil their educational responsibilities (Iflahen et al., 2024). This transition, however, presents challenges in maintaining strong connections between faculty and students. Thus, issues in implementing digital learning that concern many educational stakeholders have become apparent. Therefore, assessing whether digital learning has significantly influenced and has become a pressing issue in the education sector is important.

3. Methodology

Literature reviews are a significant step in developing an in-depth understanding of the context of the study. It is important to explore the research topic that presents the opportunity to synthesize existing research (Islam Sarker et al., 2019). However, Mengist et al. (2020b) argue that systematic literature reviews vary from traditional narrative reviews due to the determination of established methods that help to minimize errors and bias during the procedures. It is supported

by Shahrol et al. (2020) that a systematic literature review is able to identify, evaluate, interpret, and analyze the research topic comprehensively by considering the sequence steps of the process to achieve quality selected articles to answer the research questions.

Thus, this study applied the process of systematic literature reviews to answer the research questions published between January 2018 and November 2024 (7 years of studies) related to digital transformation issues in the education sector. The main purpose of conducting a systematic literature review is to thoroughly search the topic area, gather evidence, summarize the literature, and select relevant articles for the study. Therefore, to achieve this study, a systematic literature review process was carried out according to the guidelines of the SALSA framework. The framework protocol consists of four steps. The explanation for each step is indicated in Table 1 as follows:

Table 1
The steps of the SALSA framework

Stage	Description	Methods
Search	Defining the study scope and search strategy	Study scope: digital transformation issues in the online education environment. Search strategy: identify keywords, search strings, search databases.
Appraisal	Selecting studies by selecting only relevant papers	Defining the papers needed to answer the research questions by specifying the inclusion and exclusion criteria.
Synthesis	Data extraction and categorization of data	Extracting the data, categorizing the data, synthesizing the results, and readying it for further analysis work.
Analysis	Data analysis	Analyzing the data, showing the results, making comparisons, and summarizing results with the discussions and conclusions.

In conducting a systematic literature review, following the steps to gain positive results in executing the final result is important. Each of the steps and its outcome is explained in detail as follows:

3.1 Stage 1 (Search) – Study Scope And Search Strategy

The first stage is to define the study scope and develop a search strategy. The scope of this study is dealing with digital transformation issues in online learning environments. According to Mengist et al. (2020b), determining the research scope is challenging, but it helps reduce the exhaustive literature searches once it is determined. Based on the research scope, the research questions were formulated as a boundary to optimize the proper research method. The details of the steps to conduct Stage 1 are as follows:

A) Research questions

Firstly, to ensure that the literature search is systematic and does not deviate from its focus, the research questions were formulated and followed by sub-questions as a critical step for facilitating a good literature search. It must be channelled to narrow the search for a specific topic (Grewal et al., 2016). This approach guarantees the research scope and helps to identify the review work (Mengist et al., 2020a). The research questions are also important to help direct the research and focus the processes on the content found in the literature. Thus, the context of

the research question is set out as follows: RQ1 - *What issues in digital learning within the education sector have been highlighted in the previous research?* and RQ2 - *Are any suggestions proposed to overcome the problem?* These were the research questions that the SALSA approach would be used to answer in the study. Thus, to carry out a comprehensive systematic literature review, it is necessary to employ a proper process that consists of a search strategy and a delivery process.

B) Search strategy

The search strategy is a crucial part of conducting the literature review. It helps to define the topic area and significantly determine relevant articles. However, it is emphasized by (Mengist et al. (2020b) that a pilot literature search should be conducted to dedicate the search terms to cover the specified study objectives before conducting the actual systematic literature review. Therefore, the keywords and their possible combinations were determined to define the appropriate search strategy. It is crucial to specify the subject matter of the study and choose the right keywords during the process (Siksnyte-Butkiene et al., 2021). For further investigation, the relevant databases were recognized: Science Direct, Scopus, and Web of Science (WoS), which are prominent in publishing research in the educational field. Then, the following terms (and their equivalents) were used in the search: "digital transformation", "digital learning", "education", "issues", "digital education", and "challenges". The search terms were run separately or in combination. The search strings of logical operators such as (AND) and (OR) were also employed as searching approaches.

The next step was determining the databases. The process of selecting the literature for this study includes the indexing databases search of Scopus, Science Direct, and Web of Science, all of which have a reputation for publishing research in educational fields. Thus, this study was conducted using the selected databases to collect relevant and trusted publications. Scopus is an international database known for international peer-reviewed publications. At the same time, Science Direct is the world's premier online collection database platform that publishes scientific research across topics and disciplines. In comparison, the Web of Science is a platform that provides access to multiple databases that accumulate references from various academic disciplines.

The number of articles returned in each database by using the keywords ("digital learning", "digital transformation", AND "education") between 2018 and 2024 is depicted in Table 2:

Table 2
Database resources and number of articles

Database	Number of articles
Scopus	1,439
Science Direct	2,561
Google Scholar	27,100
Emerald Insight	560
Web of Science (WoS)	1,593
Springer Link	48,240
TOTAL	81,493

In the systematic literature review process, following the steps and guidelines given in the frameworks is important. Based on the steps elaborated above, the preliminary protocol included

i) defining the keywords and their synonyms, ii) initial search in indexing databases, and iii) building the search string as a searching strategy. Thus, the next step is to build a search strategy by using the logical operators (OR) and (AND) and their possible combinations in the search process. This process helps to limit the search for articles in the study context only.

The works of literature have been extensively searched from renowned databases (Scopus, Science Direct, and WoS) using the final keywords embedded in a Boolean search string with the (OR) and (AND) operators. These searches were conducted between the title, abstract, and keywords. The article has then been carefully deliberated on which information needs to be included and excluded as relevant articles to answer the research topics. A comprehensive and thorough search of primary articles identifies inclusion and exclusion criteria for quality assessment (Shahrol et al., 2020), explained further in Stage 2 (Appraisal).

3.2 Stage 2 (Appraisal) – Inclusion and Exclusion Criteria

In conducting the systematic review of this study, the inclusion and exclusion criteria were imposed to ensure only related studies were collected. This process ensures that the appropriate criteria are used to scope the searches. The inclusion criteria are the characteristics that the articles must possess when seeking inclusion in a study. On the other hand, the exclusion criteria are the characteristics that should have the articles excluded or disqualified in the search process. Table 3 shows all the criteria that were included and extracted from the article searches:

Table 3
Inclusion and exclusion criteria

Search Requirements	Criteria	
	Inclusion	Exclusion
Year	Paper published between 2018 until 2025	All papers before 2018
Document types	Only research article	All review articles, case reports, discussions, data articles, books, and others
Subject area	Only social sciences and educational research	All fields and subject areas that are not social science or education
Access	Only open-access papers and journals that the institution subscribes to are available	Limited access or restricted access, and all paid journals
Language	English language	All languages other than English
Relevancy	Articles relevant to the topic under investigation (only focused on issues of digital transformation in education)	All irrelevant articles, such as those on non-digital transformation issues and those not in the education field, are excluded

At this stage, the inclusion and exclusion criteria strategy was imposed to provide a specific focus on the search process. The inclusion and exclusion criteria also help the researchers capture only relevant articles and not waste unnecessary effort. Thus, all the search processes will follow the appraisal requirements (see Table 3) as a formal quality assessment of the articles. Surprisingly, almost a third of the articles did not meet the selection criteria (see Figure 1 for further details).

After the articles had met the search criteria, they were reviewed to ensure only related articles were selected. Thus, to ensure the articles meet the appraisal criteria, the title and abstract were

screened to determine the relevance of the articles. It is emphasized by Cavalcanti et al. (2021) that only the title and abstract of the study are read by the reviewers, who then choose whether or not to include it based on inclusion and exclusion criteria. Thus, to ensure the selection process was efficient, the title and abstract were read as part of the screening exercise to determine the relevance and suitability of the article for review. It is helpful to do the reading as it provides the researchers with a specific focus to correctly include or extract the articles as the main results (Newman & Gough, 2020). In addition, papers that were not full-text articles, unobtainable, and unrelated to digital transformation in education were also discarded. The next step was extracting the data (Stage 3).

3.3 Stage 3 (Synthesize) – Data extraction

In this stage, the articles need to be extensively evaluated to ensure only related articles are selected for review and are able to answer the research questions. All the articles are read and schemed carefully to fit into the context of the study. Cavalcanti et al. (2021) emphasize that it is important to read the full text of the articles to extract the information related to answering the research questions.

All the retrieved and accumulated articles then undergo the evaluation process to extract relevant and appropriate information. The final number of included studies in this systematic literature review was 26 articles. Figure 1 illustrates the article's selection process:

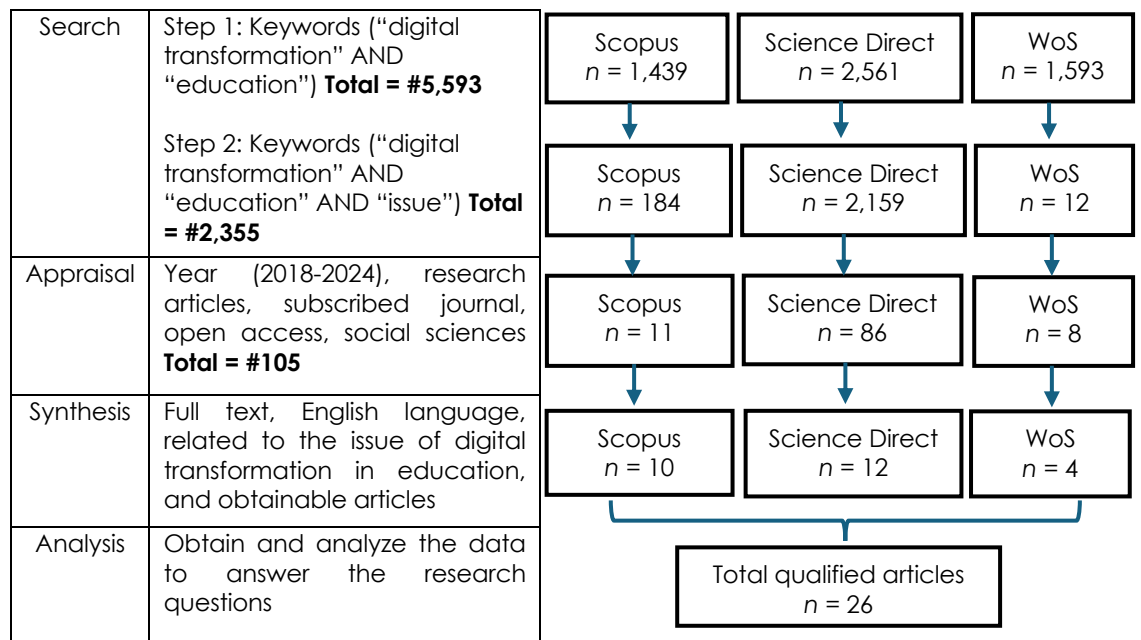


Figure 1: The SALSA steps

This study has been done by implementing the SALSA steps as a research guideline to obtain significant information for review. At the beginning stage, a total of 81,493 articles have been found on various database platforms. Then, 22,609 articles were recognized from three databases (Scopus, Science Direct, and WoS) when the combination of search strings with various keywords and their synonyms was used to search the articles. In the search process, a

total of 2,355 articles were identified after the use of keywords ("digital transformation" AND "education" AND "issue") to narrow down the search scope specific to the research topic. Then, 105 articles were sorted after the appraisal process by setting the inclusion and exclusion criteria. Later, about 84 articles were excluded from 105 articles for several reasons, such as no full text, not in the English language, not a journal article, no study pertaining to issues in digital transformation, and not related to education studies. Finally, 26 articles were reviewed, which consisted of journal articles, to explore the issues in digital learning in higher education environments.

Following the final selection of eligible studies, the study developed a standardized data extraction form to ensure consistency in the data collection process. Each study underwent a thorough review, during which key data points were systematically extracted, encompassing bibliographic information, contextual details, focus areas, and findings along with their implications. The extracted data were analyzed thematically through a combination of inductive and deductive techniques. Subsequently, core themes were refined through iterative comparisons to ensure their accurate representation of the evidence base. To enhance the validity and reliability of the findings, the study undertook systematic verification steps, meticulously documenting all decisions related to inclusion, exclusion, and coding. This comprehensive documentation facilitates both replication and transparency in the research methodology.

3.4 Stage 4 – Data analysis

Data analysis is the process of describing and transforming data to reveal useful information. The analysis phase evaluates the aggregated data and extracts key information and conclusions from the selected articles (Mengist et al., 2020b). In this case study, the data were obtained from information extracted from the final list of selected articles. The data from the selected articles will then be summarized accordingly (see Table 5 for further details). According to Newman & Gough (2020), the data analysis depends on the information extracted from the articles. However, according to Shelby and Vaske (2008, as cited in Mengist et al., 2020b), results conveyed in a systematic literature review depend on the interpretation and assessment of the researcher. Therefore, the analysis and results reported in this study relied on the researcher's judgment and understanding to reasonably communicate the results as evidence of the outcome.

In this phase, the formulated research question is answered. The data from all selected published articles were captured to report results, imply discussion, indicate directions for future research, and draw conclusions. Finally, the final data on issues of digital transformation in education sectors) were presented in the table (see Table 4), grouped in the same category. The output was extracting relevant data from the selected articles, as defined and indicated in Table 4.

Table 4
Digital learning issues

Category	Issues	Description	References
Organizational issues	Infrastructure, Technical support	Organizational behaviours and the effort of digital spaces affect the implementation of digital transformation in higher education.	Aditya et al., 2022; Bygstad et al., 2022; Vicente et al., 2020; Juliet et al., 2022; Karim et al., 2025; Gabriel & Nyahwema, 2025; Ghansah, 2025
	Funding	Financial constraints in light of	Juliet et al., 2022; Vicente et al.,

		the rising cost of education and transformative approaches.	2020
Technological issues	Adoption of digital technologies or the use of digital tools	Gaps in digital technology or digital tools continue to be a significant obstacle to changing educational institutions and practices.	Alhubaishy & Aljuhani, 2021; Alwafi, 2021; Bond et al., 2018; Cattaneo et al., 2022; livari et al., 2020; Juliet et al., 2022; Mhlanga & Denhere, 2022
	Digital resources	The emergence of digital learning required an appropriate digital infrastructure to facilitate educational activities that demand a foundation in technical aspects.	Alhubaishy & Aljuhani, 2021; Bygstad et al., 2022; Damşa et al., 2021; Gabriel & Nyahwema, 2025; Ghansah, 2025; Jackson, 2019; Juliet et al., 2022; Karim et al., 2025; Vicente et al., 2020
Human aspects	Pedagogy	The complexity of academic teaching services and related intellectual values. Describes the way to regulate the learning and teaching process in the digital learning environment.	Alwafi, 2021; Banhegyi & Fajt, 2022; Bygstad et al., 2022; Detyna et al., 2022; Domingues et al., 2023; Ghansah, 2025; Iflahen et al., 2024; Karim et al., 2025; Mhlanga & Denhere, 2022; Moldavan et al., 2022; Sjöberg & Lilja, 2019
	Workload	The time load borne by educators when implementing the teaching and learning process.	Cattaneo et al., 2022
	Personal traits	The individual's context stimulates and engages with students in digital learning activities to empower the learning process or digital transformation. Personal traits are classified as attitude, self-efficacy, knowledge, skills, competence, culture, awareness, and integrity.	Alhubaishy & Aljuhani, 2021; Alwafi, 2021; Cattaneo et al., 2022; Damşa et al., 2021; Gabriel & Nyahwema, 2025; Hämmäläinen et al., 2021; livari et al., 2020; Jackson, 2019; Karim et al., 2025; Moldavan et al., 2022; Núñez-Canal et al., 2022; Pham et al., 2021; Vicente et al., 2020

4. Results

In order to acquire the findings, the research questions also appear in the table as milestones that help the researcher complete the study's objectives. The table may help the researcher understand the content of the review (Newman & Gough, 2020). All of the chosen articles have been organized into a table that is intended to assist a researcher in the focus of the study and to obtain a clearer picture of the previous research issues. Table 5 lists the details and overview of the articles with the answers to each research question.

Table 5
Findings from the systematic review

Source/Year	Findings (Issues) (RQ1)	Recommendations (RQ2)
Aditya et al. (2022)	The issues were classified into four categories based on an organizational perspective (contextual barrier, social barrier, technical barrier, and cultural barrier).	A systematic framework for the organization to implement digital transformation in higher education is proposed.
Mhlanga & Denhere (2022)	Gaps in digital technology are wide (limited access to technology, educators' need for pedagogy training, and resistance to change among academicians).	A comprehensive, coordinated approach to digital transformation and technology access is required.
Sjöberg & Lilja (2019)	The educators are ambivalent about using digital technology in their pedagogical practices, and that hesitation is mixed with optimism because technology in teaching is linked to organizational and societal processes outside their direct control.	Theoretical frameworks that highlighted individual competence development as a means of integrating technology into higher education teaching are described.
Arnold et al. (2021)	Both the teaching staff and students responded ambivalently to digital teaching environments.	All dimensions of digital transformation processes (in digital teaching) need further investigation.
Bond et al. (2018)	Academicians need to increase their professional development further, and students' use of digital tools depends on their implementation.	Further research should be conducted at various German universities with varying characteristics and geographical locations to understand the students' and academicians' perceptions of digital tools.
Banhegyi & Fajt (2022)	Students need guidance in online learning environments.	Causes (by qualitative data) behind students' perceptions of online learning environments are recommended to be explored.
Bygstad et al. (2022)	The three underlying obstacles: unintegrated digital resources (technical aspect), the alignment between new practices and digital subjects (pedagogy aspect), and the digital learning space (organizational aspect)	Investigating the emergence of digital learning spaces in developing economies.
Cattaneo et al. (2022)	Personal factors, attitude toward technology, digital tool use, and teachers' workload play a principal role in teachers' digital competence development.	Supporting digital transformation in vocational education requires advancements in teachers' digital competencies.
Hämäläinen et al. (2021)	Three factors are associated with digital competence: skills, attitudes, and	Further investigation of how the skills, attitudes, and knowledge merge in

	knowledge to shape the digital transformation in schools.	teaching professional development.
Damşa et al. (2021)	Educators' digital competence and use of digital technologies for teaching must be viewed in the context of new teaching practices.	The study suggests sustained development in digital competence and engagement with digital technologies as the foundation of online teaching.
Pham et al. (2021)	Digital transformation in Vietnamese education has put pressure on students' readiness.	Development of further research for developing countries is recommended.
Núñez-Canal et al. (2022)	The educators' digital competence involves knowledge, training, attitude, and pedagogy challenges impacting students' learning.	Digital pedagogy and students' satisfaction with digital environments in universities should be explored.
Moldavan et al. (2022)	The conflicts and tensions of teachers (pedagogical design for digital learning platforms requires standardized practices with room for exploration).	The self-efficacy of the digital learning platform should be explored.
Juliet et al. (2022)	The successful pedagogical use of media social adoption is associated with fund allocations, technical competence, level of privacy, and government regulations.	The number of respondents within Africa and more developed countries should be increased.
Meum et al. (2021)	The learning activities in nursing require digital competence, knowledge, skills, and educational technology tools.	Not stated.
Jackson (2019)	The three central pitfalls in higher education in digital transformation were competency, knowledge, and digital technologies.	The framework suggests higher education must engage more fully in learning cycles to adjust to external market demands and information.
Iivari et al. (2020)	There are issues with technology access and use, skills, and competencies that involve both adults (teachers and parents) and children to integrate digital tools into learning and teaching practices.	Teachers should be given skills and competencies to respond to challenging digital learning situations.
Alhubaishy & Aljuhani (2021)	The failures of digital transformation are poor learning performance, a lack of access to resources, and a fear of change.	The scope of this research could be broadened by including challenges from other stakeholders.
Vicente et al. (2020)	The main constraints of digital innovation in education are limited infrastructure and resources, lack of funding, technological resources, conservative academic culture, and technical support.	Further investigation into geographic distance should be conducted to understand the perception of digital infrastructure and resources for educational digital innovation.
Alwafi (2021)	Most teachers give feedback on issues around digital transformation (such as training programs, the adaptation of technology, pedagogy, technology	Future research suggests looking at teachers' anxiety and confidence levels.

	use, and communication).	
Detyna et al. (2022)	The pedagogical and technical settings were the challenges in implementing a hybrid learning environment.	Further evaluation on technology acceptance among educators and students is recommended.
Domingues et al. (2023)	The students believed remote teaching harmed their learning, even though it was convenient.	The survey key areas for further investigation include learning challenges like attention deficit hyperactivity disorder (ADHD), the differences between synchronous and asynchronous classes, and the effects of single sessions taught by unfamiliar professors.
Iflahen et al. (2024)	i. Technological barriers and resource distribution significantly impact learning quality. ii. Ongoing innovation in teaching is necessary to effectively adapt methods for online learning. iii. Fair access to learning resources is essential.	Identifying the key challenges includes ensuring stakeholder readiness and securing adequate logistics and training. Recent COVID-related literature lacks consistency, making it difficult to forecast long-term impacts.
Gabriel & Nyahwema (2025)	i. Digital illiteracy and lack of technological competence. ii. Technical and infrastructure challenges. iii. Financial constraints. iv. Psychological factors, such as isolation and mental fatigue.	A multisectoral approach to targeted digital literacy training, subsidized internet access, and recognizing mental health resources to cope with the demands of online learning is recommended.
Ghansah (2025)	i. Limited Internet access. ii. Inadequate digital literacy. iii. Technical infrastructure limitations.	Targeted investment in digital infrastructure, comprehensive training for digital literacy, and policy reforms to support sustainable online education for improving resilience in future disruptions.
Karim et al. (2025)	i. Obstacles to digital accessibility, especially for rural students. ii. Internet connectivity and device availability. iii. Pedagogical challenges (low participation rates and insufficient faculty training) . iv. The integrity of assessments (AI tools).	Improving infrastructure, developing digital training programs, and implementing AI assessment methods (integrity awareness) to make online learning a long-term strategy for national education development.

To ensure a systematic presentation of the findings, Table 5 provides summaries of the main findings and corresponding practical recommendations derived from the reviewed studies. Each entry highlights the source, the main issue identified (RQ1), and the corresponding recommendation (RQ2) proposed in the reviewed studies. Notably, this study highlights several key issues related to digital transformation in educational settings. Significantly, it can be identified into three major domains: (1) Technological Issues, referring to barriers related to digital tools, infrastructure, and technical access; (2) Organizational Issues, covering institutional policies, resources, and management practices; and (3) Human Aspects, encompassing educators' and

learners' digital competencies, motivation, attitudes, and pedagogical adaptation. The information and findings obtained from the articles were carefully recorded to assess their quality and the relevance of the data. The information was then used to answer the research questions.

5. Discussion

With the revolution of the technology era, the education sector has realized that digital learning is necessary in educational developments to stay ahead of the curve and thrive in the digital environment. Even though digital transformation helps to improve educational performance, past research revealed that it was still challenging to execute successfully in educational institutions (Aditya et al., 2022). This study has recognized three issues based on the insights derived from this systematic literature review: technology, organization, and human aspects (see Table 5). Each of the three categories of issues is discussed further as follows:

5.1 Technology

Generally, education technology has aimed to augment education programming by improving teaching and learning administration. According to Garcez et al. (2022), digital technology is a tool that can aid in developing an adaptive teaching and learning strategy. Utilizing digital technology is now seen as a vital and potentially effective technique for assuring greater learning and education (Islam Sarker et al., 2019). However, multiple obstacles impede the education sector's digital learning journey, especially in adopting technologies into the education system (Aditya et al., 2022).

Adoption of digital technologies. The adoption of digital technology in numerous educational sectors has assumed increasing importance. Technology has been used to facilitate the teaching and learning process by integrating online and learning activities as new interactions in course content. Thus, changes to the education landscape certainly affect and are affected by the readiness of the educational institutions and their stakeholder to embrace and use new technological assets (Shahrol et al., 2020; Bygstad et al., 2022; Juliet et al., 2022; Iflahen et al., 2024).

Use of digital tools. Within the technology context, using digital tools is the key issue to adopting technology in educational institutions. Using digital tools to establish a digital learning space is challenging for educators and students (Bygstad et al., 2022), creating hurdles to successful digital learning. A great effort in the use of digital tools to deliver lessons is necessary to foster the efficacy of education (Núñez-Canal et al., 2022). As new challenges arise in digital learning, educational institutions and their stakeholders must adapt digital development into the teaching and learning process as an opportunity to enhance digital transitions in academic institutions. Thus, the use of digital tools is becoming increasingly important not only in pedagogical elements but also at all levels of educational institutions in order to expedite the digital transition.

5.2 Organization

Organizational aspects in educational institutions play an important role in the planning, administering, and designing of many digital systems. Organizational involvement was significant in implementing digital learning to enable organizational performance and competitive advantage. However, the study by Sjöberg & Lilja (2019) reveals that educators are reluctant but optimistic about employing digital technology in their pedagogical practice because integrating technology in teaching is linked to organizational processes outside their direct control.

Infrastructure and digital resources. Infrastructure and digital resources are the critical elements for achieving digital transformation. However, it is emphasized by Alhubaishy & Aljuhani (2021)

that the lack of resources and support is one of the factors hindering the adoption of digital learning in educational institutions. The inability of the organization to provide better infrastructure and proper digital resources was a contributing factor to the failure of digital transformation (Jackson, 2019). In order to deal with the transformation and the quick changes in the digital landscape, the organization must scale up or down quickly. Thus, it is important to establish and work on further investigation of infrastructure and digital resource issues to help education institutions redesign their strategies and remain competitive.

Technical support. Technical support is crucial in the evolution of the use of technologies in education. Technical support and qualified educators are necessary to ensure success in the digital transformation (Núñez-Canal et al., 2022). Interestingly, it is revealed by Vicente et al. (2020) that technical support is among the top barriers to digitalization. In addition, according to Sjöberg & Lilja (2019), technical support is essential to raising educators' acceptance of using technology in educational settings. Thus, it is necessary for further research to understand the technical support needed by both educators and students in the acceptance of digital transformation in educational institutions.

Funding. Finance is critical to the successful execution of any digitalization endeavour. In fact, financial constraints are the internal barriers that have to be faced by the top management in the organization (Vicente et al., 2020). Therefore, sufficient fund allocations are significant as the strategy for successfully implementing digital technologies in educational institutions (Juliet et al., 2022). The majority of research, however, does not include financial limitations as a component of the study; therefore, this aspect has received comparatively little attention in prior and recent studies.

5.3 Human aspects

A digital transformation strategy's success or failure is thought to be largely dependent on human factors (Alhubaishy & Aljuhani, 2021). Thus, the resistance from human behaviour and attitude needs to be overcome. As Núñez-Canal et al. (2022) mentioned, a positive attitude and effort will enhance teaching and learning opportunities.

Pedagogy and andragogy. Digital technology utilization in educational activities creates new pedagogical style opportunities. Any field change will never be simple since it requires developing new educational techniques and technological resources. Therefore, altering the mindsets and attitudes of educators towards contemporary learning approaches and professional development is imperative for effectively implementing innovations that foster active learning and enhance student engagement (Iflahen et al., 2024). Pedagogical strategies and digital technology tools require skills and training (Makarova & Makarova, 2018). However, the need for pedagogies is increasingly critical and obvious in digital learning contexts (Derreth & Wear, 2021) as it demands for structure and predictability, as well as the requirement for a variety of high-quality learning opportunities (Meum et al., 2021). Thus, potential issues stemming from abrupt changes in teaching approaches require additional support and analysis.

Workload. In any educational institution, digital learning is necessary to approach the digital environment. For some educators, the transformation involves much effort, contributing to the increase in workload. According to Sjöberg & Lilja (2019), digital transformation means an increased workload and stress. The educators' concerns about the workload become anxieties impacting the teaching and learning experience (Taylor, 2014, as cited in Sjöberg & Lilja, 2019). At a glance, technology may appear to help educators reduce their workload, but the actual reality that educators encounter must be grasped from the perspective of educators themselves. Therefore, an appropriate setting for implementing digital transformation involves understanding

the workload endured by educators. In addition, the study conducted by Cavalcanti et al. (2021) proposed reducing the workload of educators as an initiative to ease the educators' work in digital learning environments. However, it is revealed by Cattaneo et al. (2022) that previous research rarely considered workload as a relevant factor in digital learning environments. It is also emphasized by Røe et al. (2022) that less attention is given by educational institutions to the workload borne by educators, which may contribute to the lack of educators' competence and barriers to the success of digital transformation. As a result, this study identified workload as a human component that requires additional consideration since it may play a significant role in adopting digital transformation in educational institutions.

Personal traits. Human behaviours and characteristics can pose significant challenges to implementing digital transformation (Alhubaishy & Aljuhani, 2021). Among the issues that deal with human aspects are skills, attitudes, competence, self-efficacy, and knowledge, which contribute to achieving their digital transformation goal. However, human aspects need better understanding, especially in the digital environment, to ensure the successful adoption of digital transformation. Understanding individual traits can be enhanced by professional development and increasing the use of digital technologies in education environments (Hämäläinen et al., 2021). Therefore, it is emphasized by Iflahen et al. (2024) that shifting the mindsets and attitudes of educators regarding learning methodologies and professional development is essential to ensure the successful implementation of digital learning. Thus, further investigation is needed to assess different individuals' perspectives on undergoing significant changes in digital environments (Pham et al., 2021).

In a nutshell, the COVID-19 pandemic has significantly accelerated the evolution of online learning. However, the absence of direct comparisons in current COVID-related literature complicates the prediction of long-term effects, underscoring the need for ongoing research within public education (Iflahen et al., 2024). Thus, it is important to note that the overall impact of COVID-19 on educational practices cannot be directly compared to the broader adoption of digital education. As mentioned by (Iflahen et al., 2024), the variability in recent COVID-related literature makes long-term forecasting challenging. Thus, these factors were considered critical in transforming education sectors into digital environments. These concerns must be highlighted, even though educational institutions have embraced the digital revolution.

6. Conclusion

The digital transformation in the education sector is growing fast due to technological advancements and new demands in education systems to provide diverse teaching and learning structures. Modern technology and the integration of digital technology provide a variety of learning possibilities and allow the interaction of academicians and students in any distant scenario. Even though the COVID-19 pandemic has significantly expedited the transition to online learning, it is essential to recognize that the overall impact of the pandemic on educational practices cannot be directly equated with the broader trend of digital education adoption. Thus, it is necessary to understand the concerns of the education sectors and provide an evidence-based perspective on existing research findings on digital transformation issues in education environments. Significantly, digital transformation in education can be achieved if the institutions take a holistic approach by providing sufficient strategies and the educational stakeholders pull in the same direction to implement quality digital education.

This systematic literature review has been done to discover the issues highlighted in adapting to digital transformation from an educational perspective. This study also informed us that digital transformation in the education sector is a reality that will change our education pattern in the

future. The implementation of digital education has become promising and is changing with technology integration for better teaching and learning. Thus, to ensure the success of digital education in the coming years, it is imperative to prioritize comprehensive training for both educators and students. Their active participation is crucial to the effectiveness of the teaching and learning process.

The study reveals that there are mainly a few issues facing the education sector in adopting digital transformation, such as technology utilization, organizational support, and human involvement, which should all be given equal attention. The finding suggests that the efforts for digital transformation in the education sector should integrate all aspects of input as strategies for positive digital changes for better teaching-learning environments and educational institutions. For this reason, a comprehensive approach is imperative for effectively addressing the multifaceted challenges of digital education, as it significantly influences the trajectory of future educational developments. Due to technological advancement and the changing nature of the era, a digital transformation is no longer an option but a requirement that must be accomplished. Indifference to this change may result in educational institutions experiencing scarce resources and the inability to survive in the digital era. Therefore, opportunities, support functions (technology, human, and environment), and educational institutions must be strengthened.

Therefore, this study highlights the recommendations as follows: to acquire a deeper understanding of educators' and students' perspectives from diverse qualities and geographical locations; to consider a holistic perspective in extant research that focuses on the challenges experienced by the stakeholders; and to examine learning challenges for students and teachers of individuals with special needs. To better comprehend the issues encountered in implementing digital learning in education, it is also necessary to account for concerns from other stakeholders. Sustainable digital learning requires collaboration among multiple stakeholders. It is essential to enhance partnerships among governments, educational institutions, the private sector, and civil society organizations to facilitate resource sharing, co-develop standards, and advance digital inclusion. By employing strategic organizational planning, establishing robust technological infrastructures, and implementing human-centered pedagogical practices, stakeholders can ensure that digital learning progresses as an equitable, engaging, and resilient approach to education.

In summary, to unlock the full potential of digital education, there is a need for further research to discover the related issues and provide a more beneficial way forward to reduce the challenges. This way, educational institutions can incrementally increase their transformation through steady improvements. This study has shown that continuous research on digital transformation issues deserves further action. The findings suggest that more attention is needed to issues related to the adoption of digital transformation in the education sector. More research needs to be conducted to examine digital transformation issues, and a comprehensive approach is essential for effectively addressing the various challenges. In addition, the adaptation of digital learning raises several critical areas that require further investigation, including specific learning challenges such as attention deficit hyperactivity disorder (ADHD), the distinctions between synchronous and asynchronous instructional formats, and the implications of single classes taught by unfamiliar professors. Thus, a specific framework or model could be applied to analyze the issues leading to digital education. Consequently, continuous digital education research is necessary to ensure that the implementation of teaching and learning through digital technology can be improved and that quality education is provided in the future.

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Conflict of Interest

There are no conflicts of interest.

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