

IC-43

AI FOR ACCESSIBILITY IN EDUCATION: A SYSTEMATIC REVIEW OF EMPIRICAL RESEARCH ON EDUCATORS' ADOPTION FACTORS

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Abstract: Artificial intelligence (AI) holds immense potential to enhance accessibility in education, especially for students with learning disabilities. AI-powered solutions can break down barriers and create more equitable learning environments by providing AI tools such as personalized learning experiences, real-time captioning, and assistive technologies. However, the successful integration of AI in education depends on educators' adoption of these innovative technologies. This systematic literature review aims to synthesize the empirical research on the factors influencing educators' adoption of AI for accessibility in educational settings. A comprehensive search of databases was conducted between the years 2019 to 2024 which involved Scopus, Science Direct, Emerald Insight, ACM, Web of Science, and IEEE Xplore. From the initial results of 1,641 records, only 16 relevant articles in line with the study's objective were selected. The findings showed that perceived usefulness and ease of use of AI tools, digital competence and attitudes of educators, and institutional support are the key factors. The review also uncovered barriers such as concerns over data privacy and the need for teacher training. The results provide valuable insights for researchers, policymakers, and educational leaders seeking to harness the power of AI to create more accessible and inclusive learning experiences. Recommendations for future research and practical implications are discussed to guide the responsible integration of AI in support of Sustainable Development Goal 4 which ensures quality education for all.

Keywords: Accessibility, AI adoption, Educators' adoption, Learning disabilities, Systematic review

1. Introduction

Artificial intelligence (AI) has revolutionized many fields, including education. AI allows machines to adapt, solve problems, and perform tasks that typically require humans (Chen et al. 2020). Rizvi et al. (2023) described AI as self-improving computers that take over tasks previously done by humans. Originally, Whitby (1998) defined AI as the study of intelligent behaviour in humans, animals, and machines, which is then replicated in computers and related technologies. In education, AI has become increasingly important, offering new tools and applications that enhance learning experiences.

On the other hand, learning disabilities (LD) refer to challenges in reading, listening, speaking, and doing calculations. Different children with LDs face different difficulties; for example, some may struggle with spelling while others with calculation. In Malaysia, learning disabilities are

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a recognized category for disability registration, providing access to government support (Dzalani & Shamsuddin, 2014). AI offers significant benefits in education, such as improving students' critical and analytical skills. Tools like ChatGPT can help students understand text better, practice language skills, and provide real-time feedback (Gill et al., 2024). AI also plays a role in achieving Sustainable Development Goal 4, which aims for inclusive and equitable quality education.

Nevertheless, the successful integration of AI in education depends on educators' adoption of these innovative technologies. Thus, this study conducts a systematic literature review (SLR) to explore the relationship between the factors that influence educators' adoption of AI and AI adoption for accessibility in education. The article is divided into five parts: an introduction, a detailed methodology, a presentation of findings, a discussion of key issues, and concluding insights.

2. Methodology

The systematic review was reported following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher et al., 2009). The PRISMA flow diagram visually represents the study selection process, showing the number of studies identified, screened, assessed for eligibility and included in the final review. Next, the screened results underwent the article quality appraisal step, and finally, abstraction and data analysis.

2.1. Research Question Formulation

To contribute to a better understanding of AI among educators, this study intends to analyse the idea of technology adoption, including its fundamental components, characteristics, and theoretical foundations. Thus, the researcher adopted the PICO (Population OR Problem; Interest; Context) method as the Research Questions Development Tool (RQDT).

- 1) At what stage empirical research on educators' adoption on artificial intelligence is used right now?
- 2) What are the factors that influence educators' adoption of AI-based solutions for students with learning disabilities in Malaysia education sector?

2.2. Systematic searching strategies

Systematic searching strategies refer to a structured and methodical approach used to identify all relevant literature related to a specific research question or area of study. These strategies involve the use of predefined search terms, Boolean logic, multiple databases, and advanced search techniques to ensure a comprehensive and unbiased collection of studies (Brunton et al., 2012). There are three main steps associated in systematic searching strategies namely identification, screening, and eligibility.

2.2.1. Identification

The identification process was made through six databases. Table 1 simplifies the search strings such as Boolean operators, phrase searching, and truncations used in each advanced search throughout all databases. The documented result of an initial search is the identification process.

Table 1: Full search string used in leading databases

Section	Scopus	Web of Science (WoS)	IEEE Xplore	Emerald Insight	Science Direct	ACM
	TITLE-ABS-KEY	TS=("artificial	("artificial	("artificial	("artificial	("artificial
	("artificial	intelligence" OR	intelligence*" OR	intelligence"	intelligence	intelligence
	intelligence" OR	"AI") AND	"ai") AND	OR "AI" OR	adoption" OR	adoption" OR
	"AI" OR "e-	TS=("learning	("accessibilit*" OR	"e-learning")	"AI adoption")	"AI adoption")
	learning") AND	disabilities" OR	"inclusive	AND	AND	AND
	("learning	"special education"	education*" OR	("learning	("accessibility"	"accessibility

	disabilit*" OR "special education*" OR "inclusive education*") AND ("educator*" OR "teacher*") AND ("adopt*" OR "accept*")	OR "inclusive education") AND TS=("educators" OR "teachers") AND TS=("adoption" OR "factors")	"learning disabilities") AND ("educator*" OR "teacher*") AND ("adoption*" OR "acceptance*")	disabilities" OR "special education" OR "learning disability") AND "inclusive education" ("educators" OR "teachers")' OR "learning disorder")	OR "inclusive education" OR "learning disability") AND ("educators" OR "teachers")'	OR "inclusive education" OR "learning disability") AND ("educators" OR "teachers")'
Initial search	=1,116 document results	= 3 document results	= 8 document results	AND ("educators" OR "teachers") AND ("adoption" OR "acceptance") = 424 document results	= 39 document results	= 51 document results
Filtered/Edited search	TITLE-ABS-KEY ("artificial intelligence" OR "AI" OR "e-learning") AND ("learning disabilities" OR "special education*" OR "inclusive education*") AND ("educator*" OR "teacher*") AND ("adopt*" OR "accept*") Refined by: Language: English Document type: article and conference Exclude keyword: Covid-19 Publication stage: Final Subject area: Social Science =139 document results	TS=("artificial intelligence" OR "AI") AND TS=("learning disabilities" OR "special education" OR "inclusive education") AND TS=("educators" OR "teachers") AND TS=("adoption" OR "factors") Refined by: Document type: Article Access: Open access Year: 2019-2024 = 3 document results	("artificial intelligence*" OR "ai") AND ("accessibilit*" OR "inclusive education*" OR "learning disabilities") AND ("educator*" OR "teacher*") AND ("adoption*" OR "acceptance*") Refined by: Year: 2019-2024 = 8 document results	("artificial intelligence" OR "AI" OR "e-learning") AND ("learning disabilities" OR "special education" OR "inclusive education" OR "learning disorder") AND ("educators" OR "teachers") AND ("adoption" OR "acceptance") Refined by: Document type: Article Access: Open access Year: 2019-2024 = 34 document results	("artificial intelligence adoption" OR "AI adoption") AND ("accessibility" OR "inclusive education" OR "learning disability") AND ("educators" OR "teachers") Refined by: Document type: article and conference Year: 2019-2024 Access: Only content I have access to = 18 document results	[[All: "artificial intelligence adoption"] OR [All: "ai adoption"] AND [[All: "accessibility" OR [All: "inclusive education" OR [All: "learning disability"] OR [All: "artificial intelligence adoption"] OR [All: "ai adoption"] AND [[All: "educators" OR [All: "learning disability"] AND [[All: "educators" OR [All: "learning disability"] AND [E-publication Date: Past 5 years] Refined by: Access: Open access Document type: Article and conference = 5 document results

2.2.1. Screening

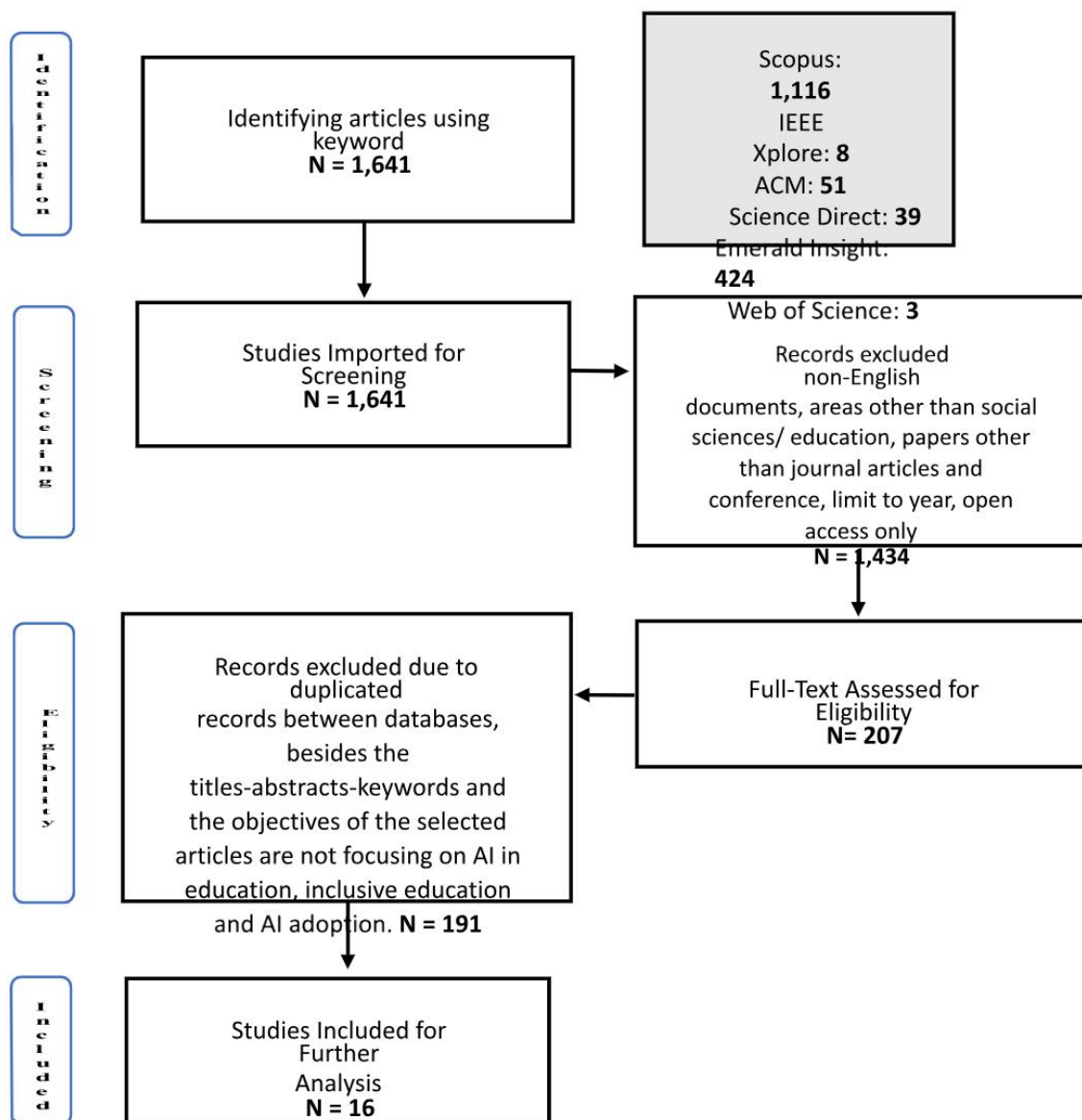
The screening process in SLR happens when the researcher filters all results obtained in the identification step. Mengist et al. (2019) confirmed that the act of screening is to select works of literature and identify relevant papers for review work. The researchers set the limits of the document

type to articles and conference only, areas to social sciences/ technology education only, and language to English only. The details could be seen in Table 1 in the filtered/edited search section.

2.2.2. Eligibility

The researchers executed the eligibility process by first scanning through the articles from the screening process. Duplicated records between all six databases were identified. Next, the researchers scanned through the titles, abstracts, and keywords as well as the objectives that are not related to AI adoption or inclusive education, where all unrelated papers were excluded in this stage. Figure 1 displays the flow diagram to illustrate the article selection process for review. The initial 1,641 records found went through the steps of identification, screening, and eligibility to reach the final records for review of only 16 articles.

Figure 1: The process of selecting the articles for the review



2.3. Article quality appraisal

To ensure the validity of the articles included in this study, certain quality assessment criteria is applied to confirm their value. Quality assessment of the candidate papers follows the guidelines outlined in the study of Kitchenham et al. (2007). Consequently, the researchers formulated the following questions to evaluate:

QA 01: Are all of the study questions answered?

QA 02: Does the publication clearly state the objectives or topic of the research?

QA 03: Is the AI technique and methodology used in this study fully defined?

QA 04: Are the limitations of this study adequately addressed?

3. Findings and Discussion

Empirical research on educators' adoption of artificial intelligence (AI) is currently in a stage where key factors influencing the adoption process are being actively explored. While the potential of AI to enhance educational outcomes is well-recognized, widespread adoption is still in its developmental stages. The review identified several critical factors that influence educators' adoption of AI into their teaching practices. Central to this is the perceived benefits of AI which educators who view AI as beneficial for improving learning outcomes are more inclined to adopt these technologies. This perception is closely linked to their familiarity with and knowledge of AI tools, underscoring the importance of adequate training and professional development. Additionally, access to necessary resources, such as AI tools and ongoing technical support, is essential for successful adoption. Institutional support, including administrative backing and policy frameworks that facilitate AI integration, also plays a crucial role. Furthermore, collaboration among educators, where experiences and strategies related to AI use are shared, contributes to a more supportive environment for technology adoption. Despite these enablers, barriers such as insufficient training, limited resources, and lack of administrative support continue to hinder the effective and widespread adoption of AI in education.

4. Recommendations, limitations, and future studies

The researchers see some gaps remaining in this investigation. The study does not fully examine the complexities of these factors or classify them as potential enablers or barriers to AI adoption. Future research should delve deeper into these aspects, categorizing them as antecedents, mediators, or outcomes in the context of AI in inclusive education. Additionally, future studies should explore the impact of AI on student outcomes, particularly from the students' perspectives, to gain a better understanding of AI's effectiveness in addressing diverse learning needs.

5. Conclusion

This study delves into the strategic application of SLR to understand the educators' adoption of AI. The analysis is meticulously focused on identifying the key factors that influence the successful implementation of AI technologies in educational settings. Through a comprehensive review of relevant empirical studies, this article highlights the crucial role of educator perceptions, resource accessibility, and professional development in facilitating AI adoption, while also identifying the significant barriers that persist in this domain.

6. Acknowledgment

This research article was financially supported by Universiti Teknologi MARA and Institute of Postgraduate Studies UiTM.

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